Service Manual

Screw Compressor

ASK T SIGMA CONTROL BASIC

9_5717 20 E

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KAESER KOMPRESSOREN

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1 Regarding this document

1.1 Using this document

The operating manual is a component of the product. It describes the machine as it was at the time of first delivery after manufacture.

- ➢ Keep the operating manual in a safe place throughout the life of the machine.
- ➢ Supply any successive owner or user with this operating manual.
- ➢ Please insert any amendment or revision of the operating manual sent to you.
- ➢ Enter details from the machine nameplate and individual items of equipment in the table in chapter 2.

1.2 Further documents

Further documents included with this operating manual are:

- Certificate of acceptance / operating instructions for the pressure vessel
- Declaration of Conformity in accordance with the applicable directive

Missing documents can be requested from KAESER.

- ➢ Make sure all documents are complete and observe the instructions contained in them.
- ➢ Make sure you provide the data from the nameplate when ordering documents.

1.3 Copyright

This service manual is copyright protected. Queries regarding use or duplication of the documentation should be referred to KAESER. Correct use of information will be fully supported.

1.4 Symbols and labels

- ➢ Please note the symbols and labels used in this document.

1.4.1 Warnings

Warning notices indicate dangers that may result in injury when disregarded.

Warning notices indicate three levels of danger identified by the corresponding signal word:

Signal term	Meaning	Consequences of disregard
DANGER	Warns of an imminent danger	Will result in death or severe injury
WARNING	Warns of a potentially imminent danger	May result in death or severe injury
CAUTION	Warns of a potentially dangerous situation	May result in a moderate physical injury

Tab. 1 Danger levels and their definition (personal injury)

Warning notices preceding a chapter apply to the entire chapter, including all sub-sections.
Example:

DANGER
The type and source of the imminent danger is shown here!
The possible consequences of ignoring a warning are shown here.
If you ignore the warning notice, the "DANGER" signal word indicates a lethal or severe injury will occur.
➢ The measures required to protect yourself from danger are shown here.

Warning notes referring to a sub-section or the subsequent action are integrated into the procedure and numbered as an action.

Example:

1. **WARNING!**
   The type and source of the imminent danger is shown here!
   The possible consequences of ignoring a warning are shown here.
   If you ignore the warning notice, the "WARNING" signal word indicates that a lethal or severe injury may occur.
   ➢ The measures required to protect yourself from danger are shown here.
2. Always read and comply with warning instructions.

1.4.2 Potential damage warnings

Contrary to the warnings shown above, damage warnings do not indicate a potential personal injury.

Warning notices for damages are identified by their signal term.

Signal term	Meaning	Consequences of disregard
NOTICE	Warns of a potentially dangerous situation	Damage to property is possible

Tab. 2 Danger levels and their definition (damage to property)

Example:

NOTICE
The type and source of the imminent danger is shown here!
Potential effects when ignoring the warning are indicated here.
➢ The protective measures against the damages are shown here.

➢ Carefully read and fully comply with warnings against damages.

1.4.3 Other alerts and their symbols

This symbol identifies particularly important information.

Material — Here you will find details on special tools, operating materials or spare parts.

Precondition — Here you will find conditional requirements necessary to carry out the task.
The conditions relevant to safety shown here will help you to avoid dangerous situations.

Option H1 — ➢ This symbol denotes lists of actions comprising one stage of a task.
Operating instructions with several steps are numbered in the sequence of the operating steps.
Information relating to one option only are marked with an option code (e.g., H1 indicates that this section applies only to machines with screw-in machine feet). Option codes used in this service manual are explained in chapter 2.2.

Information referring to potential problems are identified by a question mark.
The cause is named in the help text ...
➢ ... as is a solution.

This symbol identifies important information or measures regarding the protection of the environment.

Further information — Further subjects are introduced here.

2 Technical Specifications

2.1 Nameplate

The machine's nameplate provides the model designation and important technical information.

The nameplate is located on the outside of the machine:

- above the cooler,
  or
- on the rear of the machine.

➢ Enter here the nameplate data as a reference:

Feature	Value
Rotary Screw Compressor	
Part No.	
Serial No.	
Year of manufacture	
Rated power	
Rated motor speed	
Maximum working pressure	
Ambient temperature	

Tab. 3 Nameplate

2.2 Options

The table contains a list of possible options.

➢ Enter options here as a reference.

Option	Option code	Exists?
Modulating control	C1	
Adjustable machine feet	H1	
Air cooling	K1	
Transformer power supply for refrigeration dryer	T2	
Refrigeration dryer	T3	
Prepared for heat recovery	W1	

Tab. 4 Options

2.3 Weight

The weight given is the maximum. Actual weights of individual machines are dependent on equipment fitted.

	ASK 27	ASK 32	ASK 35
Weight [kg]	465	480	495

Tab. 5 Machine weight

2.4 Temperature

	ASK 27	ASK 32	ASK 35
Minimum cut-in temperature [°C]	3	3	3
Typical airend discharge temperature during operation [°C]	65 – 100	65 – 100	65 – 100
Maximum airend discharge temperature (automatic safety shut-down) [°C]	110	110	110

Tab. 6 Temperature

2.5 Ambient conditions

	ASK 27	ASK 32	ASK 35
Maximum elevation amsl [m]	1000	1000	1000
Permissible ambient temperature [°C]	3 – 45	3 – 45	3 – 45
Cooling air temperature [°C]	3 – 45	3 – 45	3 – 45
Intake air temperature [°C]	3 – 45	3 – 45	3 – 45
* Higher altitudes are permissible only after consultation with the manufacturer.			

Tab. 7 Ambient conditions

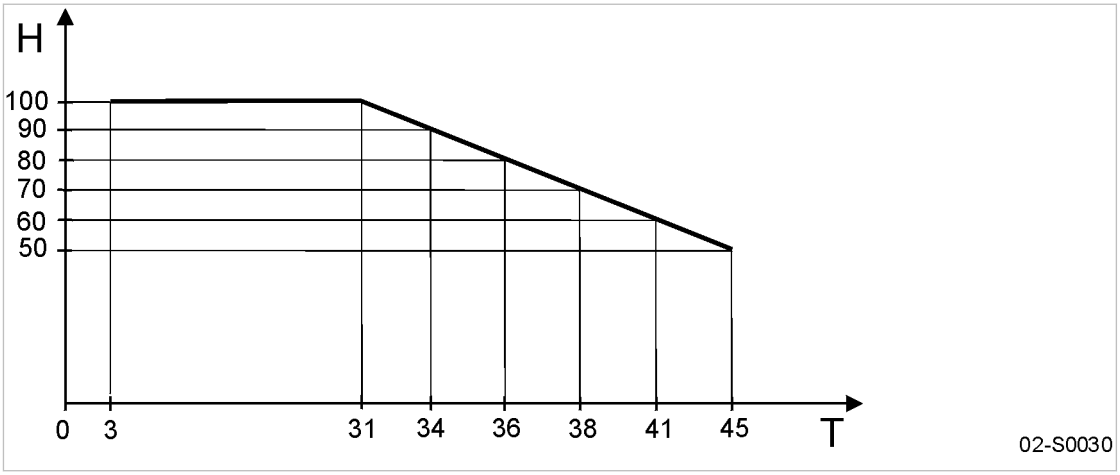


Fig. 1 Maximum relative humidity of intake air

(T) Intake air temperature [°C]
(H) Maximum relative humidity of intake air [%]

2.6 Ventilation

The values given are minimum guide values.

Mains frequency: 50 Hz

	ASK 27	ASK 32	ASK 35
Inlet aperture (Z) see figure 9 [m^2]	0.5	0.6	0.7
Forced ventilation with exhaust fan: Flow rate [m^3/h] at 100 Pa	7500	8500	9500

Tab. 8 Overview Ventilation (50Hz)

Mains frequency: 60 Hz

	ASK 27	ASK 32	ASK 35
Inlet aperture (Z) see figure 9 [m^2]	0.6	0.6	0.7
Forced ventilation with exhaust fan: Flow rate [m^3/h] at 100 Pa	8000	9000	10000

Tab. 9 Overview Ventilation (60Hz)

2.7 Pressure

Maximum working pressure: see nameplate

Pressure relief valve activating pressure at 50Hz [bar]

Maximum working over-pressure [bar]	ASK 27	ASK 32	ASK 35
8.0	10	10	10
11.0	13	13	13
15.0	16*	16*	16*

* China: 15.9

Tab. 10 Pressure relief valve activating pressure (50Hz)

Pressure relief valve activating pressure at 60 Hz [bar]

Maximum working over-pressure [bar]	ASK 27	ASK 32	ASK 35
8.5	10	10	10
11.0	13	13	13
15.0	16	16	16

Tab. 11 Pressure relief valve activating pressure (60Hz)

2.8 Delivery

Delivery [m^3/min] at 50 Hz mains frequency

Maximum working pressure [bar]	ASK 27	ASK 32	ASK 35
8.0	2.60	3.15	3.50
11.0	2.17	2.65	2.95
15.0	1.68	2.03	2.35

Tab. 12 Delivery (50 Hz)

Delivery [m^3/min] at 60 Hz mains frequency

Maximum working pressure [bar]	ASK 27	ASK 32	ASK 35
8.5	2.60	3.15	3.50
11.0	2.17	2.65	2.95
15.0	1.68	2.03	2.35

Tab. 13 Delivery (60 Hz)

2.9 Noise emission [dB(A)]

Mains frequency	ASK 27	ASK 32	ASK 35
50 Hz	65	67	69
60 Hz	67	69	71
Noise pressure level as per ISO 2151 and the basic standard ISO 9614-2, tolerance: ±3 dB(A) at maximum machine working pressure			

Tab. 14 Noise emission [dB(A)]

2.10 Motors and Power

2.10.1 Drive motor

	ASK 27	ASK 32	ASK 35
Rated power [kW]	15.0	18.5	22.0
Enclosure protection	IP 55	IP 55	IP 55

Tab. 15 Drive motor

Rated speed [min^{-1}] (50 Hz mains frequency):

Maximum working pressure [bar]	ASK 27	ASK 32	ASK 35
8.0	2945	2950	2940
11.0	2945	2950	2940
15.0	2945	2950	2940

Tab. 16 Drive motor: nominal speed at 50 Hz

Rated speed [min^{-1}] (60 Hz mains frequency):

Maximum working pressure [bar]	ASK 27	ASK 32	ASK 35
8.5	3555	3560	3555
11.0	3555	3560	3555
15.0	3555	3560	3555

Tab. 17 Drive motor: nominal speed at 60 Hz

2.11 Cooling oil recommendation

A sticker showing the type of oil filled is to be found near the oil separator filling port.
Information on ordering cooling oil is found in chapter 11.

Cooling oils for general applications

	SIGMA FLUID		
	MOL	S-460	S-570
Description	Mineral oil	Silicone-free synthetic oil	Synthetic oil
Application:	Standard oil for all applications except in connection with foodstuffs. Particularly suitable for machines with a low duty cycle.	Standard oil for all applications except in connection with foodstuffs. Particularly suitable for machines with a high duty cycle. Not suitable for East- / South-East-Asian countries.	Standard oil for East- / South-East-Asian countries, suitable for all applications except food processing. Particularly suitable for machines with a high duty cycle.
Approval	—	—	—
Viscosity at 40°°C	44 mm^2/s (DIN 51562-1)	45 mm^2/s (D 445; ASTM test)	52.8 mm^2/s (D 445; ASTM test)
Viscosity at 100 °C	6.8 mm^2/s (DIN 51562-1)	7.2 mm^2/s (D 445; ASTM test)	8.0 mm^2/s (D 445; ASTM test)
Flash point	220 °C (ISO 2592)	238 °C (D 92; ASTM test)	258 °C (D 92; ASTM test)
Density at 15 °C	—	864 kg/m^3 (ISO 12185)	0.869 kg/l (D 1298; ASTM test)
Pour point	–33 °C (ISO 3016)	–46 °C (D 97; ASTM test)	–54 °C (D 97; ASTM test)
Demulsibility at 54 °C	—	40/40/0/10 min (D 1401; ASTM test)	15 min (D 1401; ASTM test)

Tab. 18 Cooling oil recommendation

Cooling oils for applications in food processing

	SIGMA FLUID	
	FG-460	FG-680
Description	Synthetic oil	Synthetic oil
Application	Specifically for applications where the compressed air comes into contact with foodstuffs.	Specifically for applications where the compressed air comes into contact with foodstuffs.
Approval	USDA H–1, NSF Approved for the manufacture of food packaging, meat and poultry processing and other food processing applications.	USDA H–1, NSF Approved for the manufacture of food packaging, meat and poultry processing and other food processing applications.
Viscosity at 40°°C	50.7 mm^2/s (D 445; ASTM test)	70.0 mm^2/s (D 445; ASTM test)
Viscosity at 100 °C	8.2 mm^2/s (D 445; ASTM test)	10.4 mm^2/s (D 445; ASTM test)

	SIGMA FLUID	
	FG-460	FG-680
Flash point	245 °C (D 92; ASTM test)	245 °C (D 92; ASTM test)
Density at 15 °C	—	—
Pour point	—	—
Demulsibility at 54 °C	—	—

Tab. 19 Cooling oil recommendation (food processing)

Cooling oils for the operation with snow cannons

	SIGMA FLUID
	PANOLIN HLP SYNTH 46
Description	Saturated synthetic ester with additives (mineral oil free). Easily biologically degradable as per OECD criteria.
Application	Specifically designed for machines intended for the operation with snow cannons.
Approval	—
Viscosity at 40°°C	47 mm^2/s
Viscosity at 100 °C	8.1 mm^2/s
Flash point	> 210 °C
Density at 15 °C	0.92 g/ml
Pour point	–35 °C
Demulsibility at 54 °C	—

Tab. 20 Cooling oil recommendation (machines for snow cannons)

2.12 Cooling oil charge

For machines with the Option W1, the volume required additionally for the heat recovery must be added to the charge.

	ASK 27	ASK 32	ASK 35
Fluid volume* [litre]	11	11	11
Topping up volume [litres] (minimum–maximum)	2	2	2
* Plus the oil volume of the heat recovery system.			

Tab. 21 Cooling oil charge (Option K1)

Option W1 **Heat recovery**

The additional volume corresponds to the oil volume of the heat exchanger and the connecting lines:

	ASK 27	ASK 32	ASK 35
Additional charge volume [l]*			

* Enter the volume required by your heat recovery system.

Tab. 22 Cooling oil charge (Option W1)

2.13 Power Supply

Basic requirements

The machine is designed in accordance with the conditions for an electrical power supply specified by EN 60204-1 (IEC 60204-1 section 4.3.
In the absence of other user-specified conditions, the limits laid down in this standard must be adhered to.
It is recommended that the user and the supplier reach an agreement on the basis of the EN 60204-1, ANNEX B.

The machine requires a symmetrical three-phase power supply.
In a symmetrical three-phase supply the phase displacement and voltages are equal for all phases.

The machine may only be operated from an earthed TN or TT three-phase supply.

Connection to an IT supply is not permitted without taking further measures (earth leak detection, etc.).

Further requirements

Demands on a three-phase supply for a machine with the following equipment:

- Refrigeration dryer powered from a transformer

This machine may only be supplied from an earthed TN or TT three-phase supply in which the **neutral point** is earthed.

The machine may not be connected to a three-phase supply in which one of the phases is earthed, as this can lead to dangerous voltage surges.

Connection to an IT network is not permitted without further measures being taken (earth leak detection, specially designed frequency converter, etc.).

Further information The wiring diagram in chapter 13.4 contains further details of the power supply connection.

2.14 Power supply specifications

The following supply cable conductor diameters (copper multi-core) and fusing (slow-blow class gL/gG) are selected according to the German DIN VDE 0100-430 (IEC 60364-4-43 and IEC 60364-4-473) and DIN VDE 0298-4 standards for 30°C ambient temperature and wiring type C.

➢ For other application conditions, check conductor diameters and change accordingly.

Other conditions would include, for example:

- Higher temperature
- Other cable installation method
- Cable length >50 m

2.14.1 Mains frequency: 50 Hz

Rated voltage: 200V±10%/3/50Hz

	ASK 27	ASK 32	ASK 35
Backup fuse [A]	80	100	100
Supply cable [mm²]	4x25	4x35	4x35
Current input [A]	69	83	91

Tab. 23 Mains supply 200V/3/50Hz

Rated voltage: 230V±10%/3/50Hz

	ASK 27	ASK 32	ASK 35
Backup fuse [A]	80	80	100
Supply cable [mm²]	4x25	4x25	4x35
Current input [A]	61	72	79

Tab. 24 Mains supply 230V/3/50Hz

Rated voltage: 400V±10%/3/50Hz

	ASK 27	ASK 32	ASK 35
Backup fuse [A]	40	50	50
Supply cable [mm²]	4x10	4x10	4x10
Current input [A]	35	38	45

Tab. 25 Mains supply 400V/3/50Hz

2.14.1.1 Network conditions

The network conditions apply to machines connected to public mains supplies with the following characteristics.

- Mains frequency 50 Hz
- Voltage between exterior and neutral lines 220 V...250 V
- Voltage between the exterior lines 380 V...440 V

They do not apply to private power supplies within industrial areas isolated from the public mains.

Machines with current consumption >16 A...≤75 A comply fully with IEC 61000-3-12.

The machines listed in table are intended for operation with a public power supply with a network impedance at the transfer point (house connection) of maximum Z_{max} [Ohm].

The operator must ensure that the machines are only connected to a network that meets these requirements. If necessary, ask the local electricity company for the value of the network impedance.

	ASK 27	ASK 32	ASK 35
Anticipated number of start-stop cycles per hour	15	15	15
Highest permissible system impedance* Z_{max} [Ohm]	0.049	0.028	0.021
*Specification related to the sum of impedances in external and neutral lines.			

Tab. 26 Supply conditions at 400V/3/50Hz

2.14.2 Mains frequency: 60 Hz

Rated voltage: 230V±10%/3/60Hz

	ASK 27	ASK 32	ASK 35
Backup fuse [A]	80	80	100
Supply cable [mm^2]	4x25	4x25	4x35
Current input [A]	64	74	84

Tab. 27 Mains supply 230V/3/60Hz

Rated voltage: 380V±10%/3/60Hz

	ASK 27	ASK 32	ASK 35
Backup fuse [A]	50	50	63
Supply cable [mm^2]	4x10	4x10	4x16
Current input [A]	39	45	51

Tab. 28 Mains supply 380V/3/60Hz

Rated voltage: 440V±10%/3/60Hz

	ASK 27	ASK 32	ASK 35
Backup fuse [A]	40	50	50
Supply cable [mm^2]	4x6	4x10	4x10
Current input [A]	32	38	43

Tab. 29 Mains supply 440V/3/60Hz

Rated voltage: 460V±10%/3/60Hz

	ASK 27	ASK 32	ASK 35
Backup fuse [A]	40	50	50
Supply cable [mm^2]	4x6	4x10	4x10

	ASK 27	ASK 32	ASK 35
Current input [A]	32	37	42

Tab. 30 Mains supply 460V/3/60Hz

2.15 Option W1 Available heat capacity

The quality of the heat transfer medium and its required flow rate depend on the type of heat exchanger used.

Maximum permissible pressure loss in the cooling air circuit: 0.6 bar

Maximum heat capacity available*	ASK 27	ASK 32	ASK 35
[kW]	13.0	15.8	17.8
[MJ/h]	47	57	64
[kcal/h]	11188	13598	15319
* With the combination valve set to open at 80 °C.			

Tab. 31 Heat capacity (option W1)

2.16 Refrigeration dryers

Model

	ASK 27	ASK 32	ASK 35
Model *			
* Read off the dryer model from the dryer nameplate and enter it in the table.			

Tab. 32 Refrigeration dryer: Model

Compressed air system

	ABT 27	ABT 32
Pressure drop [bar] (referred to 7 bar working pressure)	0.2	0.2
Maximum permissible working pressure [bar]	16	16

Tab. 33 Refrigeration dryer: Compressed air system

Refrigerant circuit

The refrigeration dryer contains a refrigerant that is classified by the Kyoto Protocol as a fluorinated global warming gas.

	ABT 27	ABT 32
Refrigerant	R 134a	R 134a
Global warming potential (GWP)	1300	1300
Charge quantity* [kg]		
Maximum permitted working pressure [bar] (high pressure end)	21	21
Maximum permitted working pressure [bar] (low pressure end)	16	16
Safety pressure switch: Cut-out pressure [bar]	21	21
* Read off the charge quantity from the dryer nameplate and enter it in the table.		

Tab. 34 Refrigeration dryer: Refrigerant circuit

3 Safety and Responsibility

3.1 Basic instructions

The machine is manufactured to the latest engineering standards and acknowledged safety regulations. Nevertheless, dangers can arise through its operation:

- danger to life and limb of the operator or third parties,
- damages to the machine and other material assets.

Disregard of warning or safety instructions can cause serious injuries!

➢ Use this machine only if it is in a technically perfect condition and only for the purpose for which it is intended; observe all safety measures and the instructions in the service manual.

➢ Immediately rectify (have rectified) any faults that could be detrimental to safety!

3.2 Specified use

The machine is intended solely for generating compressed air for industrial use. Any other use is considered incorrect. The manufacturer is not liable for any damages that may result from incorrect use. The user alone is liable for any risks incurred.

➢ Keep to the specifications listed in this service manual.

➢ Operate the machine only within its performance limits and under the permitted ambient conditions.

➢ Do not use compressed air for breathing purposes unless it is specifically treated.

➢ Do not use compressed for any application that will bring it into direct contact with foodstuffs unless it is specifically treated.

3.3 Improper use

Improper usage can cause damage to property and/or (severe) injuries.

➢ Only use the machine as intended.

➢ Never direct compressed air at persons or animals.

➢ Use hot cooling air for heating purposes only if there is no risk to the health of humans or animals. If necessary, hot cooling air should be treated by suitable means.

➢ Do not allow the machine to take in toxic, acidic, flammable of explosive gases or vapours.

➢ Do not operate the machine in areas in which specific requirements with regard to explosion protection are in force.

3.4 User's Responsibilities

3.4.1 Observe statutory and universally accepted regulations

This is, for example, nationally applied European directives and/or valid national legislation, safety and accident prevention regulations.

➢ Observe relevant statutory and accepted regulations during installation, operation and maintenance of the machine.

3.4.2 Qualified personnel

These are people who, by virtue of their training, knowledge and experience as well as their knowledge of relevant regulations can assess the work to be done and recognise the possible dangers involved.

Authorised operators possess the following qualifications:

- are of legal age,
- are conversant with and adhere to the safety instructions and sections of the service manual relevant to operation,
- have received adequate training and authorisation to operate electrical and compressed air devices.
- Additional qualifications for compressors with refrigeration dryers:
  - Adequate training and authorisation ton refrigeration devices.

Authorised installation and maintenance personnel have the following qualifications:

- are of legal age,
- have read, are conversant with and adhere to the safety instructions and sections of the service manual applicable to installation and maintenance,
- are fully conversant with the safety concepts and regulations of electrical and compressed air engineering,
- are able to recognise the possible dangers of electrical and compressed air devices and take appropriate measures to safeguard persons and property,
- have received adequate training and authorisation for the safe installation and maintenance on this equipment.
- Additional qualifications for compressors with refrigeration dryers:
  - fully conversant with the safety concepts and regulations concerning refrigeration devices,
  - must be able to recognise the possible dangers of refrigeration devices and take appropriate measures to safeguard persons and property.

➢ Ensure that operating, installation and maintenance personnel are qualified and authorised to carry out their tasks.

3.4.3 Adhere to inspection schedules and accident prevention regulations

The machine is subject to local inspection schedules.

Examples of German operation

➢ Carry out recurring inspections to BGR 500, chapter 2.11:
The user must ensure that the machine's safety devices are checked for function as required or at least annually.

➢ Carry out oil changes to BGR 500, chapter 2.11.
The user must ensure that the cooling oil is changed as required or at least annually and the oil change must be documented. Intervals may be varied if an analysis proves that the oil is still usable.

➢ Keep to inspection intervals in accordance with the Ordinance on Industrial Safety and Health with maximum intervals as laid down in §15.

Inspection	Inspection interval	Inspecting authority
Installation and equipment inspection	Before commissioning	Approved supervisory body
Internal inspection	Every 5 years after installation or the last inspection	Competent person (e. g. KAESER Service Technician)
Strength test	Every 10 years after installation or the last inspection	Competent person (e. g. KAESER Service Technician)

Tab. 35 Inspection intervals according to regulations

3.5 Dangers

Basic instructions

The following describes the various forms of danger that can occur during machine operation.

Basic safety instructions are found in this service manual at the beginning of each chapter in the section entitled 'Safety'.

Warning instructions are found before a potentially dangerous task.

3.5.1 Safely dealing with sources of danger

The following describes the various forms of danger that can occur during machine operation.

Electricity

Touching voltage carrying components can result in electric shocks, burns or death.

- ➢ Allow only qualified and authorised electricians or trained personnel under the supervision of a qualified and authorised electrician to carry out work on electrical equipment according to electrical engineering regulations.
- ➢ Before commissioning or re-commissioning the machine, the user must ensure adequate protection against electric shock from direct or indirect contact.
- ➢ Before starting any work on electrical equipment:
  Switch off and lock out the power supply isolator and verify the absence of any voltage.
- ➢ Switch off any external power sources.
  These could be connections to floating relay contacts or the electrical machine heating, for example.
- ➢ Use fuses corresponding to machine power.
- ➢ Check regularly that all electrical connections are tight and in proper condition.

Forces of compression

Compressed air is contained energy. Uncontrolled release of this energy can cause serious injury or death. The following information concerns work on components that could be under pressure.

- ➢ Close shut-off valves or otherwise isolate the machine from the distribution network to ensure that no compressed air can flow back into the machine.

➢ De-pressurise all pressurised components and enclosures.
➢ Do not carry out welding, heat treatment or mechanical modifications on pressurised components (e.g. pipes and vessels) as this influences the component's resistance to pressure. The safety of the machine is then no longer ensured.

Compressed air quality

The composition of the compressed air must be suitable for the actual application in order to preclude health and life-threatening dangers.

➢ Use appropriate systems for air treatment before using the compressed air from this machine as breathing air and/or for the processing of foodstuffs.
➢ Use foodstuff-compatible cooling oil whenever compressed air is to come into contact with foodstuffs.

Spring forces

Springs under tension or compression store energy. Uncontrolled release of this energy can cause serious injury or death.
Minimum pressure / check valves, pressure relief valves and inlet valves are powerfully spring-loaded.

➢ Do not open or dismantle any valves.

Rotating components

Touching the fan wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

➢ Do not open the enclosure while the machine is activated.
➢ Switch off and lock out the power supply disconnecting device and verify the absence of any voltage.
➢ Wear close-fitting clothes and a hair net if necessary.
➢ Make sure all covers and safety guards are in place and secured before re-starting.

Temperature

High temperatures are generated during compression. Touching hot components may cause injuries.

➢ Avoid contact with hot components.
These include, for example, compressor airends or blocks, oil and compressed air lines, coolers, oil separator tanks, motors and machine heaters.
➢ Wear protective clothing.
➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapours or parts of the machine.

Noise

The enclosure absorbs the machine noise to a tolerable level. This function will be effective only if the enclosure is closed.

➢ Operate the machine only with intact sound insulation.
➢ Wear hearing protection if necessary.
The blowing-off of the pressure relief valve can be particularly loud.

Operating fluids/materials

The used operating fluids and materials can cause adverse health effects. Suitable safety measures must be taken in order to prevent injuries.

- ➢ Strictly forbid fire, open flame and smoking.
- ➢ Follow safety regulations when dealing with oils, lubricants and chemical substances.
- ➢ Avoid contact with skin and eyes.
- ➢ Do not inhale oil mist or vapour.
- ➢ Do not eat or drink while handling cooling and lubricating fluids.
- ➢ Keep suitable fire extinguishing agents ready for use.
- ➢ Use only KAESER approved operating materials.

Unsuitable spare parts

Unsuitable spare parts compromise the safety of the machine.

- ➢ Use only spare parts approved by the manufacturer for use in this machine.
- ➢ Use only genuine KAESER replacement parts on pressure bearing parts.

Conversion or modification of the machine

Modifications, additions to and conversions of the machine or the controller can result in unpredictable dangers.

- ➢ Do not convert or modify the machine!
- ➢ Obtain written approval by the manufacturer prior to any technical modification or expansion of the machine, the controller, or the control programs.

Extending or modifying the compressor station

If dimensioned appropriately, pressure relief valves reliably prevent an impermissible rise in pressure. New dangers may arise if you modify or extend the compressed air station.

- ➢ When extending or modifying the compressed air system:
  Check the blow-off capacity of pressure relief valves on air receivers and compressed air lines before installing a new machine.
- ➢ If the blow-off capacity is insufficient:
  Install pressure relief valves with larger blow-off capacity.

3.5.2 Safe machine operation

The following is information supporting you in the safe handling of the machine during individual product life phases.

Personal protective equipment

When working on the machine you may be exposed to dangers that can result in accidents with severe adverse health effects.

- ➢ Wear protective clothing as necessary.

Suitable protective clothing (examples):

- ■ Safety workwear
- ■ Protective gloves

- Safety boots
- Eye protection
- Ear protection

Transporting

The weight and size of the machine require safety measures during its transport to prevent accidents.

- ➢ Use suitable lifting gear that conforms to local safety regulations.
- ➢ Allow transportation only by personnel trained in the safe movement of loads.
- ➢ Attach lifting gear only to suitable lifting points.
- ➢ Be aware of the centre of gravity to avoid tipping.
- ➢ Make sure the danger zone is clear of personnel.
- ➢ Do not step onto machine components to climb up the machine.

Assembly

- ➢ Only use only electrical cables that are suitable and approved for the surroundings and electrical loads applied.
- ➢ Never dismantle compressed air pipes until they are fully vented.
- ➢ Only use pressure lines that are suitable and approved for the maximum working pressure and the intended medium.
- ➢ Do not allow connection pipes to be placed under mechanical stress.
- ➢ Do not induce any forces into the machine via the connections, so that the compressive forces must be balanced by bracing.

Positioning

A suitable installation location for the machine prevents accidents and faults.

- ➢ Install the machine in a suitable compressor room.
- ➢ Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- ➢ Ensure accessibility so that all work on the machine can be carried out without danger or hindrance.
- ➢ If installed outdoors, the machine must be protected from frost, direct sunlight, dust, rain and splashing water.
- ➢ Do not operate in areas in which specific requirements regarding explosion protection are in force.
  For instance, the requirements of ATEX directive 94/9/EC "Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres".
- ➢ Ensure adequate ventilation.
- ➢ Place the machine in such a manner that the working conditions in its environment are not impaired.
- ➢ Comply with limit values for ambient temperature and humidity.
- ➢ The intake air must not contain any damaging contaminants,
  Damaging contaminants are for instance: explosive or chemically instable gases and vapours, acid or base forming substances such as ammonia, chlorine or hydrogen sulfide.
- ➢ Do not position the machine in warm cooling outlet air from other machines.
- ➢ Keep suitable fire extinguishing agents ready for use.

Commissioning, operation and maintenance

During commissioning, operation and maintenance you may be exposed to dangers resulting from, e.g., electricity, pressure and temperature. Careless actions can cause accidents with severe adverse effects for your health.

- ➢ Allow maintenance work to be carried out only by authorised personnel.
- ➢ Wear close-fitting, flame-resistant clothing. Wear protective clothing as necessary.
- ➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.
- ➢ Check that there is no voltage on floating relay contacts.
- ➢ Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- ➢ De-pressurise all pressurised components and enclosures.
- ➢ Allow the machine to cool down.
- ➢ Do not open the cabinet while the machine is switched on.
- ➢ Do not open or dismantle any valves.
- ➢ Use only spare parts approved by KAESER for use in this machine.
- ➢ Carry out regular inspections:
  for visible damages,
  of safety installations,
  of the EMERGENCY STOP command device,
  of any components requiring monitoring.
- ➢ Pay particular attention to cleanliness during all maintenance and repair work. Cover components and openings with clean cloths, paper or tape to keep them clean.
- ➢ Do not leave any loose components, tools or cleaning rags on or in the machine.
- ➢ Components removed from the machine can still be dangerous.
  Do not attempt to open or destroy any components taken from the machine.

De-commissioning, storage and disposal

Improper handling of old operating fluids and components represent a danger for the environment.

- ➢ Drain off fluids and dispose of them according to environmental regulations.
  These include, for example, compressor oil and cooling water.
- ➢ Have refrigerant disposed of by authorised bodies only.
- ➢ Dispose of the machine in accordance with local environmental regulations.

3.5.3 Organisational Measures

- ➢ Designate personnel and their responsibilities.
- ➢ Give clear instructions on reporting faults and damage to the machine.
- ➢ Give instructions on fire reporting and fire-fighting measures.

3.5.4 Danger Areas

The table gives information on the areas dangerous to personnel.

Only authorised personnel may enter these areas.

Activity	Danger area	Authorised personnel
Transport	Within a 3 m radius of the machine.	Installation personnel for transport preparation. No personnel during transport.
	Beneath the lifted machine.	No personnel!
Installation	Within the machine. Within 1 m radius of the machine and its supply cables.	Installation personnel
Operation	Within a 1 m radius of the machine.	Operating personnel
Maintenance	Within the machine. Within a 1 m radius of the machine.	Maintenance personnel

Tab. 36 Danger Areas

3.6 Safety devices

Various safety devices ensure safe working with the machine.

- ➢ Do not change, bypass or disable safety devices.
- ➢ Regularly check safety devices for their correct function.
- ➢ Do not remove or obliterate labels and notices.
- ➢ Ensure that labels and notices are clearly legible.

Further information More information on safety devices is contained in chapter 4, section 4.8.

3.7 Safety signs

The diagram shows the positions of safety signs on the machine. The table lists the various safety signs used and their meanings.

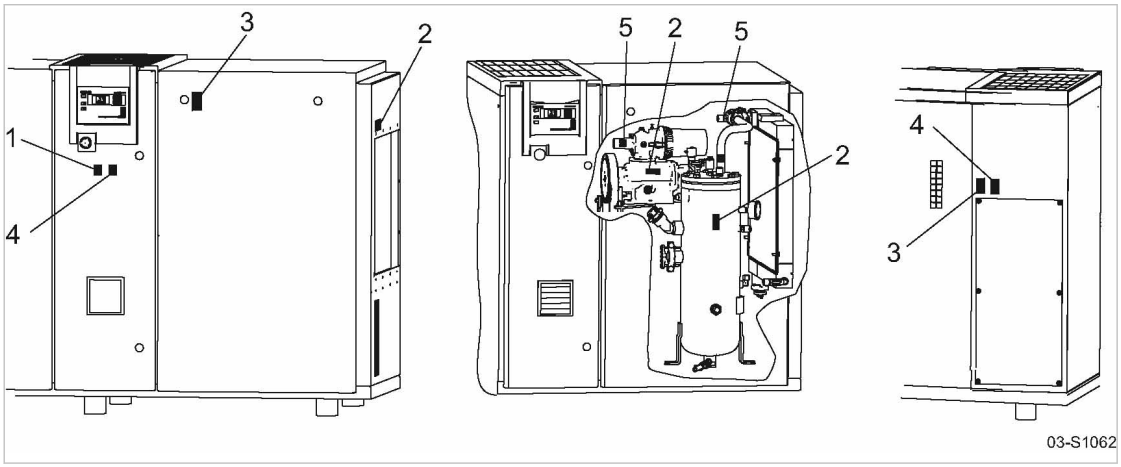


Fig. 2 Location of safety signs

Item	Symbol	Meaning
1		Danger of fatal injury from electric shock! ➢ Before starting any work on electrical equipment: Switch off and lock out the power supply disconnecting device and verify the absence of any voltage.
2		Hot surface! Risk of burns caused by contact with hot components ➢ Do not touch the surface. ➢ Wear long-sleeved garments (no synthetics such as polyester) and protective gloves.
3		Risk of serious lacerations or even severing of extremities (fingers) from rotating components. ➢ Operate the machine only with closed safety guards, access doors and panels. ➢ Switch off and lock out the mains isolating devices and verify the absence of any voltage before opening any machine enclosure or guard.
4		Risk of injury caused by an automatic machine start! ➢ Switch off and lock out the mains isolating devices and verify the absence of any voltage before opening any machine enclosure or guard.
5		Risk of fatal injury caused by dismantling valves (spring-loaded or under pressure)! ➢ Do not open or dismantle valves. ➢ Call an authorised Service Technician in the event of a fault.

Tab. 37 Safety signs

3.8 Emergency situations

3.8.1 Correct fire fighting

Suitable measures

Calm and prudent action can safe lives in the event of a fire.

- ➢ Keep calm.
- ➢ Give the alarm.
- ➢ Shut off supply lines if possible.
  Mains disconnecting device (all poles)
  Cooling water (if present)
  Heat recovery (if present)
- ➢ Warn and move endangered personnel to safety.
- ➢ Help incapacitated persons.
- ➢ Close the doors.
- ➢ When trained accordingly: Attempt to extinguish the fire.

Extinguishing substances

- ➢ Suitable extinguishing media:
  Foam
  Carbon dioxide
  Sand or soil
- ➢ Unsuitable extinguishing media:
  Strong jet of water

3.8.2 Treating injuries from handling cooling oil

Eye contact:

Cooling oil can cause irritation.

- ➢ Rinse open eyes thoroughly for a few minutes under running water.
- ➢ Seek medical help if irritation persists.

Skin contact:

Cooling oil may irritate after prolonged contact.

- ➢ Wash thoroughly with skin cleaner, then with soap and water.
- ➢ Contaminated clothing should be dry-cleaned before reuse.

Inhalation:

Cooling oil mist may make breathing difficult.

- ➢ Clear air passages of oil mist.
- ➢ Seek medical help if difficulty with respiration continues.

Ingestion

- ➢ Wash out the mouth immediately.
- ➢ Do not induce vomiting.
- ➢ Seek medical aid.

3.8.3 Injury from Handling Refrigerant

Eye contact:

Severe eye irritation, watering, reddening and swelling of the eyelids.
Risk of caustic burns and frostbite.

- ➢ Open eyelids wide to allow product to evaporate.
- ➢ Hold the eyelid wide and rinse the eye with running water.
- ➢ Consult an ophthalmologist if you experience lasting pains.

Skin contact:

Initially a sensation of chill, skin may redden subsequently.
Risk of frostbite.

- ➢ Allow the product to evaporate.

➢ Rinse with lukewarm water.
➢ Consult a physician if experiencing lasting pain or reddened skin.

Inhalation:

At high concentrations, risk of cardiac irregularity (arrhythmia).
At very high concentration, risk of asphyxia caused by oxygen deficiency.

➢ Remove victim to the fresh air.
➢ If necessary Respiration with respirator or administration of oxygen.
➢ Consult a physician if experiencing breathing or nerve complaints.

3.9 Warranty

This service manual contains no independent warranty commitment. Our general terms and conditions apply with regard to warranty.

A condition of our warranty is that the machine is used solely for the purpose for which it is intended and under the conditions specified.
Due to the multitude applications for which the machine is suitable the obligation lies with the user to determine its suitability for his specific application.

Furthermore, we accept no warranty obligation for:

- the use of unsuitable parts or operating materials,
- un-authorised modifications,
- incorrect maintenance,
- incorrect repair.

Correct maintenance and repair includes the use of genuine KAESER spare parts and operating materials.

➢ Obtain confirmation from KAESER that your specific operating conditions are suitable.

3.10 Environment protection

The operation of this machine may cause dangers for the environment.

➢ Do not allow cooling oil to escape to the environment or into the sewage system.
➢ Store and dispose of operating materials and replaced parts in accordance with local environment protection regulations.
➢ Observe national regulations.
This applies particularly to parts contaminated with compressor cooling oil.

4 Design and Function

4.1 Enclosure

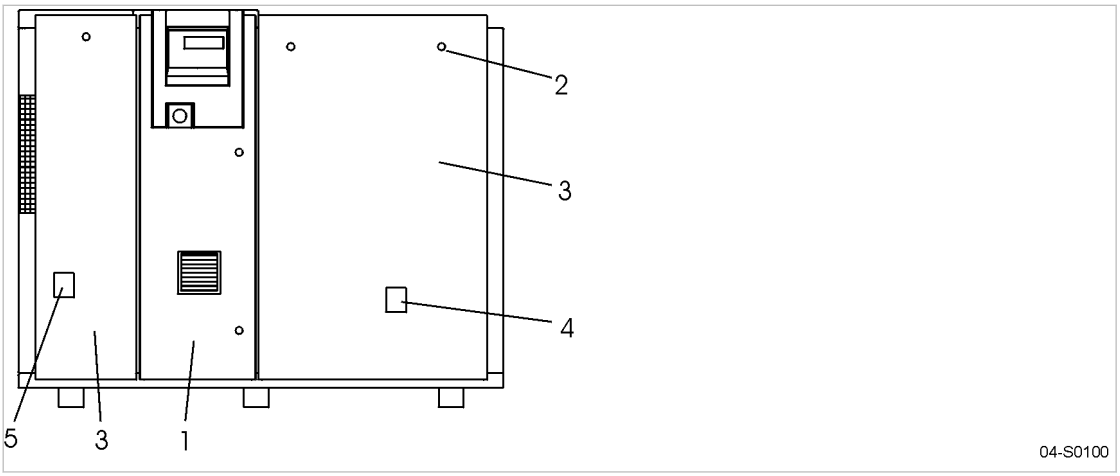


Fig. 3 Enclosure overview

1 Control cabinet door
2 Latch
3 Panel (removable)
4 Sight glass: Oil level indicator
5 Sight glass: Condensate drain

When closed, the enclosure serves various functions:

- Sound insulation
- Protection against contact with components
- Cooling air flow

The enclosure is not suitable for the following uses:

- Walking on, standing or sitting on.
- As resting place or storage of any kind of load.

Safe and reliable operation is only assured with the enclosure closed.

Access doors are hinged to swing open and removable panels can be lifted off. Latches are released by a key supplied with the machine.

4.2 Machine function

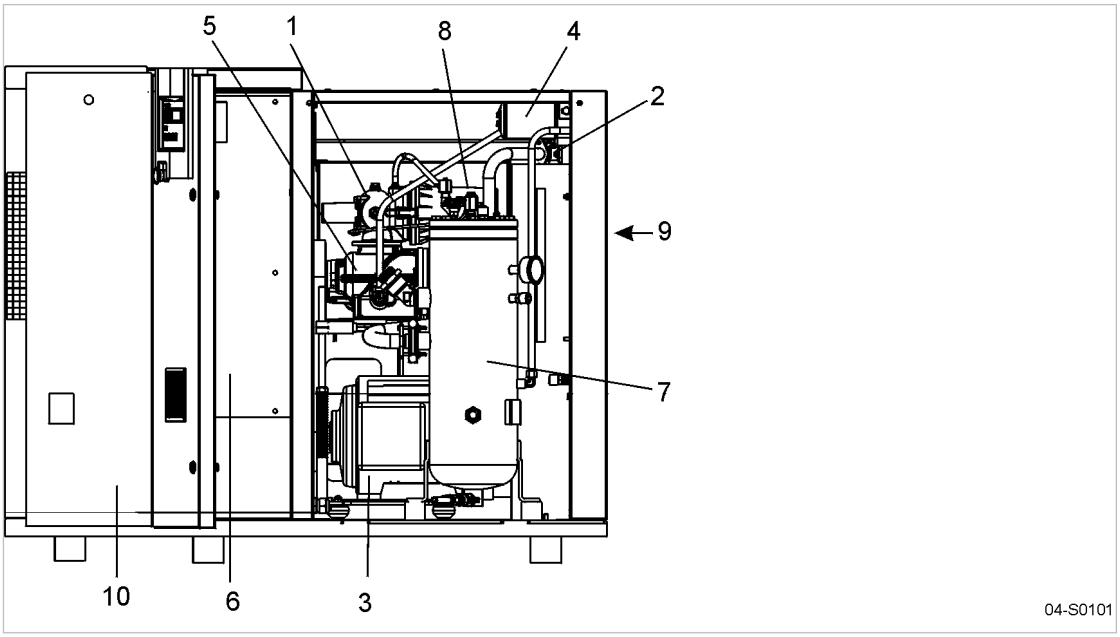


Fig. 4 Machine layout

[1]	Inlet valve	[6]	Control cabinet
[2]	Minimum pressure/check valve	[7]	Oil separator tank
[3]	Compressor motor	[8]	Air filter
[4]	Oil filter	[9]	Oil/air cooler
[5]	Airend	[10]	Add-on cabinet for refrigeration dryer

Ambient air is cleaned as it is drawn in through the filter [8].

The air is then compressed in the airend [5].

The airend is driven by an electric motor [3].

Cooling oil is injected into the airend. It lubricates moving parts and forms a seal between the rotors themselves and between them and the airend casing. This direct cooling in the compression chamber ensures a very low airend discharge temperature.

Cooling oil recovered from the compressed air in the oil separator tank [7] gives up its heat in the oil cooler [9]. The oil then flows through the oil filter [4] and back to the point of injection. Pressure within the machine keeps the oil circulating. A separate pump is not necessary. A thermostatic valve maintains optimum cooling oil temperature.

Compressed air, freed of cooling oil in the oil separator tank [7], flows through the minimum pressure / check valve [2] into the air cooler [9]. The minimum pressure / check valve ensures that there is always a minimum internal pressure sufficient to maintain cooling oil circulation in the machine.

The aftercooler brings down the compressed air temperature to 5K to 10K above ambient. Most of the moisture carried in the air is removed in the aftercooler.

4.3 Refrigeration dryer

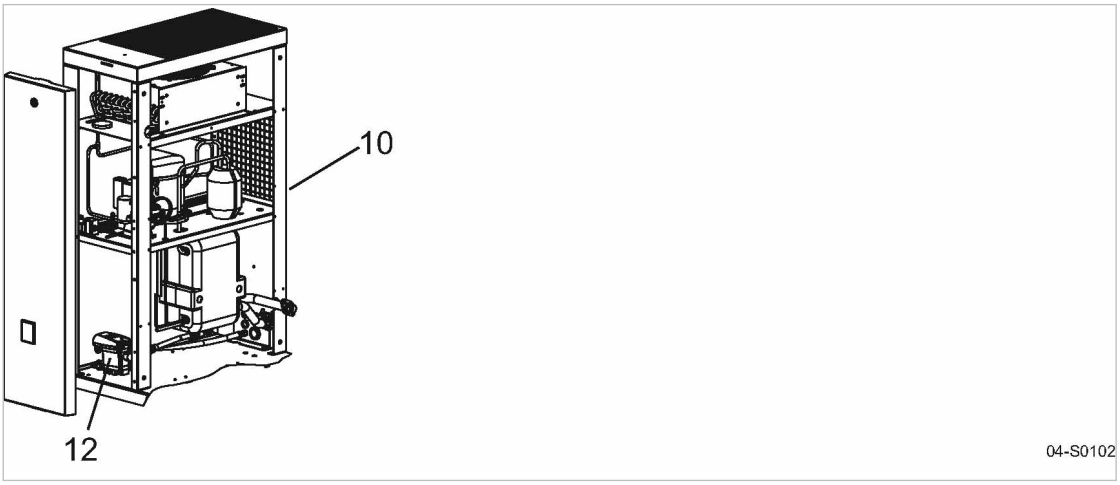


Fig. 5 Refrigeration dryer
(10) Refrigeration dryer
(12) Condensate drain

The downstream refrigeration dryer removes moisture from the compressed air.
The condensate drain ejects the precipitate.

4.4 Floating relay contacts

Floating relay contacts are provided for the transfer of signals, messages.
Information on location, loading capacity and type of message or signal is found in the electrical diagram.

If the floating relay contacts are connected to an external voltage source, voltage may be present even when the machine is isolated from the power supply.

4.5 Options

The options available for your machine are described below.

4.5.1 Option H1 Machine mountings

These mountings allow the machine to be anchored firmly to the floor.

Fig. 6 Machine mountings

4.5.2 Option W1 Prepared for external heat recovery

The cooling oil circuit includes 2 valves regulating the cooling oil temperature.

- Combination valve: Oil cooler temperature regulator
- Thermostatic valve: Heat recovery system oil temperature regulator

The oil temperature regulators ensure that the cooling oil is kept at the ideal temperature for machine operation.
The thermostatic valve opens first so that surplus heat is released into the heat recovery system. If the heat recovery system cannot remove sufficient heat, the combination valve opens to additionally release the cooling circuit via the oil cooler.

Condition:
Combination valve opening temperature = thermostatic valve opening temperature

The heat available for recovery depends on the individual operating conditions of the machine.

Connections are provided for an external system to recover surplus heat.

The thermostatic valve is deactivated when the machine is delivered. The necessary operating element must be installed when installing the heat recovery system.

If necessary, the operating element in the combination valve can be exchanged for one with higher opening temperature. The opening temperature depends on operating and ambient conditions. Operating elements are marked with their opening temperature [°C].

If the cooling oil temperature is too low, condensate can form and damage the machine.

➢ Consult KAESER Service on components and layout to ensure proper functioning of the cooling and heat recovery systems.

4.6 Operating modes and control modes

4.6.1 Operating modes

The machine operates in the following modes:

- LOAD:
  The inlet valve is open. The airend delivers compressed air to the distribution network.
  The drive motor runs under full load.
- IDLE:
  The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the distribution network. The venting valve is open.
  A small volume of air circulates through the bleed hole in the inlet valve, through the airend and back to the inlet valve via the venting valve.
  The compressor motor runs without load and draws little current.

- STANDSTILL:
  The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the distribution network. The venting valve is open.
  The compressor motor is stopped.

Option C1
- MODULATING CONTROL:
  With the help of a control valve (the proportional controller) the degree of opening of the inlet valve is steplessly varied in response to the air demand. The airend delivers compressed air to the distribution network.
  The load and power consumption of the drive motor rises and falls with the air demand.
  The regulating valve is factory set. The setting should not be changed without consultation with KAESER SERVICE.

4.6.2 Control modes

Using the selected control mode, the controller switches the machine between its various operational states in order to compensate for air being drawn of by consumers and maintain system pressure between the set minimum and maximum values. The control mode also rules the degree of energy efficiency of the machine.

The machine-dependant venting phase between the LOAD and STANDSTILL operating modes ensures load changes at minimum material stresses.

The controller SIGMA CONTROL BASIC can operate in the following modes:

- DUAL
- QUADRO

Option C1
- MODULATING control

Energy-efficient control modes for various applications:

Application	Recommended control mode
Compressed air station with one machine or several machines with comparable delivery	QUADRO
Machine for peak load in a compressed air station	DUAL
Machine for intermediate load in a compressed air station	QUADRO
Machine for basic load in a compressed air station	QUADRO

Tab. 38 Energy-efficient control modes

The SIGMA CONTROL BASIC controller is factory set to QUADRO control mode unless specifically ordered otherwise.

DUAL

In the DUAL control mode, the machine is switched back and forth between LOAD and IDLEto maintain the machine working pressure between the preset minimum and maximum values. When maximum pressure is reached, the machine switches to IDLE. When the preset *idling time* has elapsed the machine is STOPPED.

The *idling time* is permanently set in SIGMA CONTROL BASIC .

QUADRO

In contrast to the the DUAL regulating mode, the machine will switch from LOAD to STANDSTILL in QUADRO mode after periods with low compressed air consumption.

After periods with a high compressed air consumption, the machine will switch from LOAD to STANDSTILL after passing through IDLE.

In this control mode, the controller requires two specified times: The *running time* and the *idle / standstill time*.

The shorter these times are set, the sooner (and more frequently) the motor is stopped.

Option C1 MODULATING control

The MODULATING control completes the aforementioned control types.. It continuously changes the delivery volume within the machine's control range.

Compressed air demand	Operating modes
rises	MODULATING LOAD
falls	MODULATING IDLE STANDSTILL

Tab. 39 Operating modes under MODULATING control

4.7 Refrigeration Dryer Control Modes

The controller can operate in the following modes:

- CONTINUOUS
- TIMER

CONTINUOUS

The refrigeration dryer will remain activated even when the machine is in standby.

TIMER

The refrigeration dryer is switched on and off by a timer when the machine is in standby. In this mode, the operating temperature is held within tight limits.

This mode of control is set up at the factory.

Which control mode is the most practical, and when?

Control mode	Advantage	Disadvantage
CONTINUOUS	Constant dew point.	Higher power consumption when the machine is in standby mode.
TIMER	Lower power consumption when the machine is in standby mode.	Brief increase in dew point when the compressor re-starts

Tab. 40 Refrigeration dryer control modes

4.8 Safety devices

The following safety devices are provided and may not be modified in any way.

- EMERGENCY STOP control device:
  The EMERGENCY STOP button shuts down the compressor immediately. The motor remains stopped. The pressure system is vented.
- Pressure relief valve:
  The pressure relief valve protects the system against excessive pressure. It is factory set.
- Safety pressure switch (machine with refrigeration dryer):
  The safety pressure switch protects the refrigerant circuit against excessive pressure. It cannot be set.
- Door interlock switches:
  The machine will stop automatically if a safety interlocked door or panel is opened or removed.
- Enclosures and guards for moving parts and electrical connections
  Protect against accidental contact.

4.9 Keys and LEDs – SIGMA CONTROL BASIC

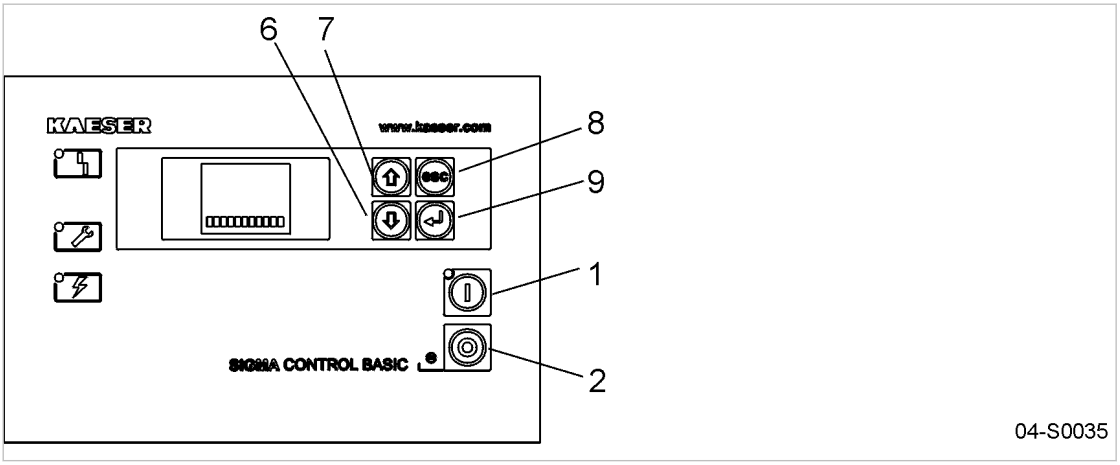


Fig. 7 Keys – overview

Item	Name	Function
1	«ON»	Switch on the machine.
2	«OFF»	Switch off the machine. Resets alarms (acknowledge). Resets the maintenance interval counter.
6	«DOWN»	Scrolls down the parameter list. Reduces a parameter value.
7	«UP»	Scrolls up the parameter list. Increases a parameter value.
8	«Escape»	Exits the edit mode without saving.

Item	Name	Function
9	«Enter»	Enters edit mode. Exits the edit mode and saves. Only affects the value in the third line of the display.

Tab. 41 Keys

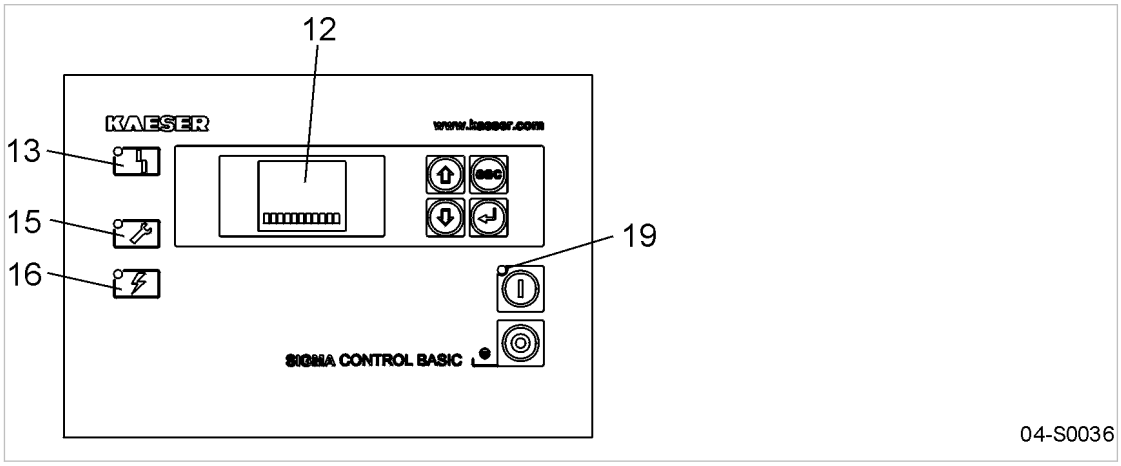


Fig. 8 Indicators

Item	Name	Function
12	Indicator field or display	Alphanumeric display with 4 lines.
13	*Fault*	Flashes red when an alarm occurs. Lights continuously when acknowledged.
15	*Warning*	Lights yellow for: ■ maintenance work due, ■ warning messages
16	*Control voltage*	Lights green when the power supply is switched on.
19	*Machine ON*	Lights green when the machine switched on.

Tab. 42 Indicators

4.10 Functional description – SIGMA CONTROL BASIC

4.10.1 Display layout

```
          xx.x bar      Line 1
             yy °C      Line 2
z          0000 h       Line 3
12345678 SpTi           Line 4
```

the line	Display	Meaning
1	xx.x	Current system pressure in bar, psi or MPa.
2	yy	Current airend discharge temperature (ADT) in °C or °F.
3	z	Display of parameters and their settings(see table 44)

the line	Display	Meaning
4	1, 2, ...	Error code for alarm and warning messages (see table 49 and table 50).
	➡	Operating state: LOAD
	⇨	Operating state: IDLE

Tab. 43 Display

4.10.2 Parameters

Parameters	Meaning
0	**Operating hours counter** Displays the total time the drive motor was switched on. Only KAESER Service has the right to change this parameter.
1	**Load hours counter** Shows the total time the compressor drive motor has run under LOAD. Only KAESER Service has the right to change this parameter.
2	**Maintenance counters** Displays the number of operating hours until the next scheduled maintenance is due. SIGMA CONTROL BASIC counts down the operating hours from a default value. The warning message *S* is displayed when the counter reaches zero. Set the counter to its original value upon completion of the service activities. The interval starts anew. A password is required to change this parameter.
3	**Relief valve test mode** This function switches the activating pressure check mode for the pressure relief valve on and off. The warning message *i* is displayed when the check mode is switched on. A password is required to change this parameter. For the inspection and the password: see chapter10.10
4	**Temperature display units** The airend outlet temperature can be displayed in either °C or °F.
5	**Pressure display units** The current working pressure can be displayed in bar, psi or MPa.
6	**Control modes** Factory setting: OFF This parameter changes the control mode: ■ OFF: QUADRO ■ ON: DUAL
7	**Refrigeration dryer control mode** Factory setting: OFF This parameter changes the dryer control mode: ■ OFF: TIMER ■ ON: CONTINUOUS

Parameters	Meaning
8	**Switching the refrigeration dryer on and off** Factory setting: ON (Option T3) This parameter switches the dryer permanently on or off: ■ OFF: refrigeration dryer off ■ ON: refrigeration dryer on A password is required to change this parameter. In machines without a refrigeration dryer, the parameter is factory set to OFF.
C	**System setpoint pressure: Switching differential** The switching differential determines the distance between cut-in and cut-out pressure (system setpoint pressure: switching point) and thus the switching frequency from LOAD to IDLE. Setting range [bar]: −0,1 ... −5,0
D	**System setpoint pressure: Switching point** The switching point corresponds to the working pressure of the air system and the cut-out pressure of the machine. Setting range [bar]: 5.5 ... maximum operating overpressure
E	**maximum possible setpoint pressure setting** Only KAESER Service has the right to change this parameter.
F	**Options** The displayed value informs KAESER Service concerning the controller's internal machine configuration.

Tab. 44 Parameters

Further information Means of changing or adjusting parameters are given in chapter 8.3.

4.10.3 Messages

Alarm message

An alarm shuts the machine down automatically. The red LED 13 flashes (Fig. 8).

Warning message

The yellow LED lights 15 to indicate a warning (figure 8).

5 Installation and Operating Conditions

5.1 Ensuring safety

The conditions in which the machine is installed and operated have a decisive effect on safety.

Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

- ➢ Strictly forbid fire, open flame and smoking.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapours or parts of the machine.
- ➢ Do not store inflammable material in the vicinity of the machine.
- ➢ The machine is not explosion-proof!
  Do not operate in areas in which specific requirements with regard to explosion protection are in force.
  For instance, the requirements of ATEX directive 94/9/EC "Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres".
- ➢ Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- ➢ Keep suitable fire extinguishing agents ready for use.
- ➢ Ensure that required ambient conditions are maintained.

Required ambient conditions may be:

- Maintain ambient temperature and humidity
- Ensure the appropriate composition of the air within the machine room:
  - clean with no damaging contaminants (e.g., dust, fibres, fine sand)
  - free of explosive or chemically unstable gases or vapours
  - free of acid/alkaline forming substances, particularly ammonia, chlorine or hydrogen sulfide.

5.2 Installation conditions

5.2.1 Determining location and clearances

The machine is intended for installation in an appropriate machine room. Information on distances from walls and ventilation is given below.

The distances quoted are recommended distances and ensure unhindered access to all machine parts.

- ➢ Please consult KAESER if you cannot comply with these recommendations.

Precondition The floor must be level, firm and capable of bearing the weight of the machine.

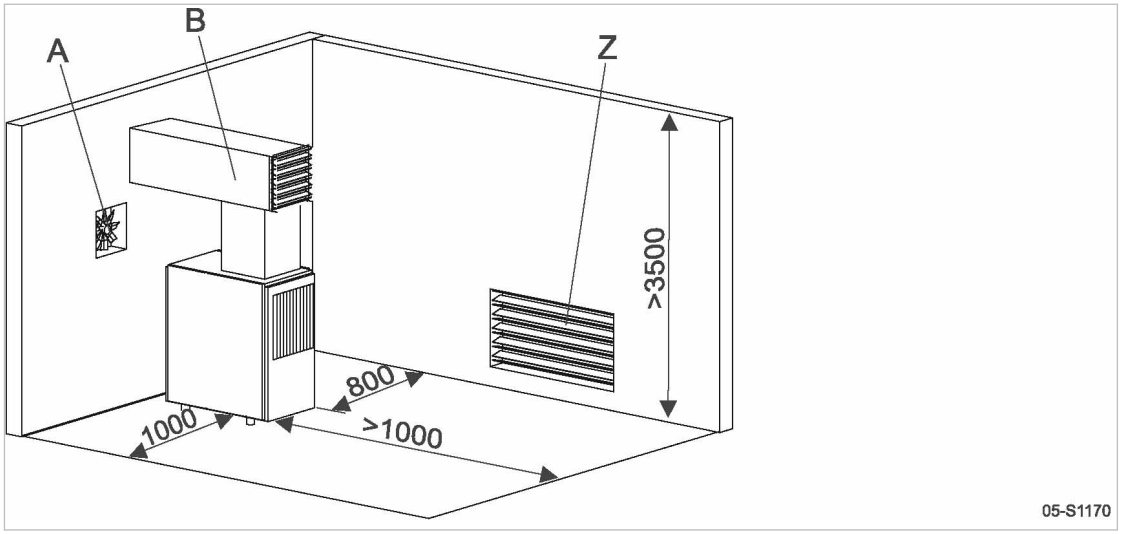


Fig. 9 Recommended machine placement and dimensions [mm]

Ⓐ Exhaust fan
Ⓑ Exhaust air duct
Ⓩ Inlet air opening

1. *NOTICE!*
   Ambient temperature too low!
   Frozen condensate and highly viscous cooling oil can cause damage when starting the machine.
   - ➢ Make sure that the temperature of the machine is at least +3 °C before starting.
   - ➢ Heat the machine room adequately or install an auxiliary heater.
2. Ensure adequate lighting so that all work on the machine can be carried out without danger or hindrance.
3. Ensure that the indicators can be read without glare and that the controller display cannot be damaged by direct sunlight (UV radiation).
4. Ensure that all intake and exhaust apertures of the enclosure remain opened.
5. If installed outdoors, the machine must be protected from frost, direct sunlight, dust and rain.

5.2.2 Ensuring the machine room ventilation

Adequate ventilation of the machine room has several tasks:

- It prevents subatmospheric pressure in the machine room.
- It evacuates the exhaust heat of the machine and thus ensures the required operating conditions.

➢ Consult with KAESER if you cannot ensure the conditions for an adequate ventilation of the machine room.

1. Ensure that the volume of air flowing into the machine room is at least equivalent to that being removed from it by the machine and exhaust fan.
2. Make sure that the machine and exhaust fan can only operate when the inlet aperture is actually open.

3. Keep the inlet and exhaust apertures free of obstructions so that the cooling air can flow freely through the room.
4. Ensure clean air in order to support the proper functioning of the machine.

5.2.3 Exhaust duct design

The machine can only overcome the air resistance at the cooling air inlet and exhaust determined by the duct design. Any additional air resistance will reduce airflow and deteriorate machine cooling.

➢ Consult the KAESER service representative before deciding on:

- the design of the exhaust air ducting
- the intersection between the machine and the exhaust air duct
- the length of the ducting
- the number of duct bends
- the design of flaps or shutters

Use only motorised ventilation flaps and louvers on variable frequency drive (SFC) machines. Flaps or shutters that are opened by the the action of airflow against the force of gravity do not open sufficiently at low cooling fan speeds.

Further information

Further information on installation of exhaust air ducts can be found in chapter 13.3.

5.3 Operating the machine in a compressed air network

If the machine is supplying an air network, the network working pressure may not exceed 16 bar (China: 15.9 bar).

When charging a fully vented air system there is generally a very high rate of airflow through the air treatment devices. These conditions are detrimental to correct air treatment. Air quality suffers. To ensure the desired air quality when charging a vented air network, we recommend the installation of an air main charging system.

➢ Consult KAESER for advice on this subject.

6 Installation

6.1 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

- ➢ Follow the instructions in chapter 3 'Safety and Responsibility'.
- ➢ Installation work may only be carried out by authorised personnel.
- ➢ Make sure that no one is working on the machine.
- ➢ Ensure that all service doors and panels are locked.

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.

- ➢ Work on electrical equipment may only be carried out by authorised electricians.
- ➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.
- ➢ Check that there is no voltage on floating relay contacts.

When working on the compressed air system

Compressed air is contained energy. Uncontrolled release of this energy can cause serious injury or death. The following safety concerns relate to any work on components that could be under pressure.

- ➢ Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- ➢ De-pressurise all pressurised components and enclosures.
- ➢ Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 bar.
- ➢ Do not open or dismantle any valves.

When working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.
Touching the fan wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

- ➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.
- ➢ Do not open the cabinet while the machine is switched on.

Further information

Details of authorised personnel are found in chapter 3.4.2.

Details of dangers and their avoidance are found in chapter 3.5.

6.2 Reporting Transport Damage

1. Check the machine for visible and hidden transport damage.
2. Inform the carrier and the manufacturer in writing of any damage without delay.

6.3 Connecting the machine with the compressed air network

Condensate in the compressed air network can damage the pipework:
- ➢ Install only corrosion-resistant pipes.
- ➢ Use fluoroelastomers as sealing material for seals.
- ➢ Note the electro-chemical voltage sequence.
- ➢ Consult with KAESER for suitable materials for the compressed air network.

Precondition The compressed air system is vented completely to atmospheric pressure.

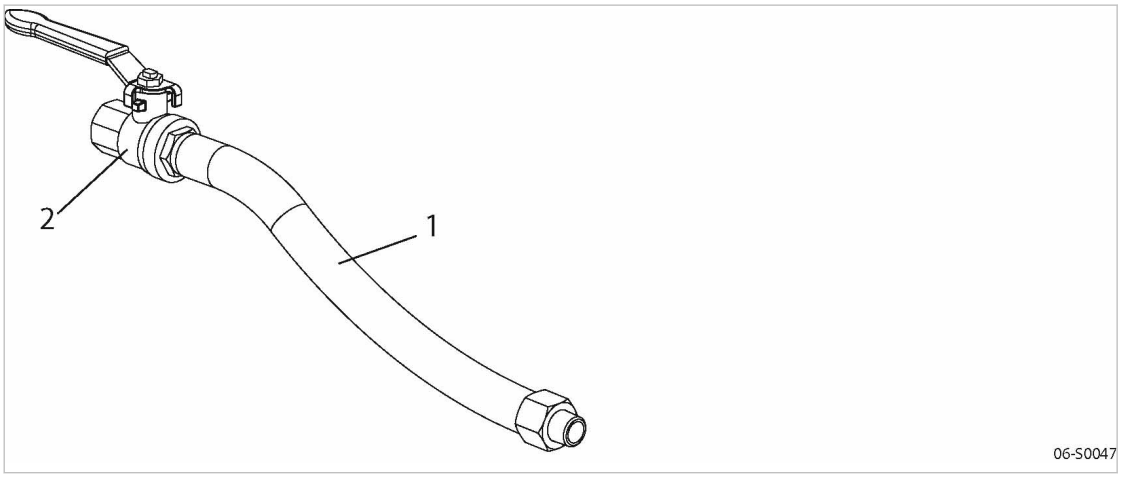


Fig. 10 Compressed pipework
[1] Flexible pressure hose
[2] Shut-off valve

- ➢ Do not induce any forces into the machine for which the compressive forces must be balanced by bracing.

1. **WARNING!**
   Serious injury or death can result from loosening or opening components under pressure.
   - ➢ De-pressurise all pressurised components and enclosures.
2. A shut-off valve must be installed by the user in the connection line.
3. Connect a flexible pressure hose.

Further information The dimensional drawing in chapter 13.3 provides the size and position of the connection ports.

6.4 Connecting the power supply

Precondition The supply isolating device is switched off,
the device is locked off,
the absence of any voltage has been verified.

1. The power supply must only be connected by authorised installation personnel or an authorised electrician.
2. Carry out safety measures as stipulated in relevant regulations (IEC 364, for example or DIN VDE 0100) and in national accident prevention regulations (BGV A3 in Germany). In addition, observe the regulations of the local electricity supplier.
3. Test the overcurrent protection cut-out to ensure that the time it takes to disconnect in response to a fault is within the permitted limit.
4. Select supply cable conductor diameters and fusing in accordance with local regulations.
5. The user must provide the machine with a lockable power supply disconnecting device. This could be, for example, a load disconnect switch with fused input. If a circuit breaker is used it must be suitable for the motor starting characteristics.
6. Check that the tappings on the control voltage transformer are connected according to the supply voltage.
   If not, change the tappings to suit the power supply voltage.

7. **DANGER!**
   Danger of fatal injury from electric shock!
   ➢ Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
8. Connect the machine to the power supply.
9. Ensure that the cabinet again complies with the requirements of degree of protection IP54.

Further information — The electrical diagram in chapter 13.4 contains further details of the power supply connection.

6.4.1 Option T2
Refrigeration dryer: Connecting the transformer according to the mains supply.

The refrigeration dryer transformer has tappings for various mains voltages.

1. Check that the correct connections are made for the supply voltage provided for the machine.
2. If necessary, re-connect the transformer to match the mains supply voltage.

Further information — The electrical diagram in chapter 13.4 contains further details of the power supply connection.

6.5 Connecting the Condensate Drain

A threaded hose connection is provided to connect a condensate drain hose to the condensate drain outlet.

Condensate must be able to drain freely.

The illustration shows typical installations.
Condensate flows downward in the collecting line. This prevents condensate flowing back to the compressor.

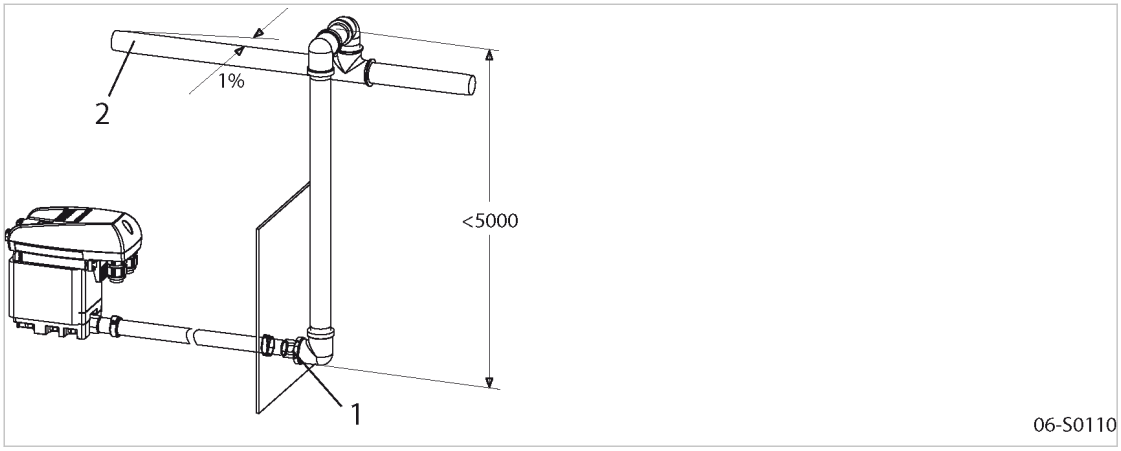


Fig. 11 Condensate drain dimensions [mm]

1 Threaded connection
2 Condensate collecting line

➢ Connect the condensate hose.

➢ Collect the condensate in a suitable container and dispose of in accordance with environmental regulations.

Further information The dimensional drawing in chapter 13.3 gives the size and position of the condensate drainage connection ports.

6.6 Connecting the remote LOAD-IDLE control

Material Screwdriver: DIN 5264 A – 0.4x2.5 mm
Flexible conductor: 0.5–1.5 mm² (maximum length 100 m; recommended: NYSLYÖ 2x1.0 mm²)

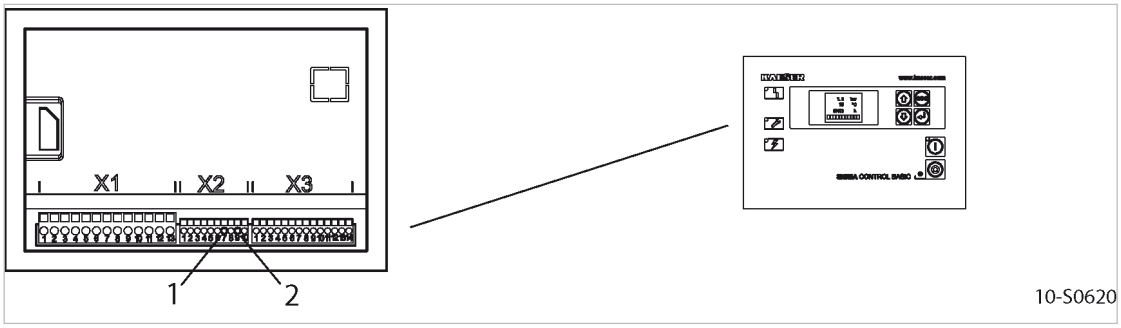


Fig. 12 Connections SIGMA CONTROL BASIC

1 Input I4: Pin 7
2 Supply 24 VDC: Pin 9

1. Lay the cable in a manner that it is not stressed when the control cabinet door is opened.
2. Strip 8 mm of insulation from the ends of the conductors.
3. Use a screwdriver to open the spring-loaded terminals and insert the ends of the conductors in the square openings above the corresponding terminals.
4. Secure the cable so there is no tension on the X2 plug.
5. Seal the cable gland against ingress of dirt or moisture.

6.7 Options

6.7.1 Option H1
Anchoring the machine

➢ Use appropriate fixing bolts to anchor the machine.

Further information Details of the fixing holes are contained in the dimensional drawing in chapter 13.3.

6.7.2 Option W1
Connecting the external heat recovery system

An unsuitable heat exchanger or incorrect installation may influence the cooling oil circuit within the compressor. Damage to the machine will follow.

➢ Consult KAESER on a suitable heat exchanger and have KAESER Service do the installation.

7 Initial Start-up

7.1 Ensuring safety

Here you will find instructions for a safe commissioning of the machine.
Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

- ➢ Follow the instructions in chapter 3 'Safety and Responsibility'.
- ➢ Commissioning tasks may only be carried out by authorised personnel!
- ➢ Make sure that no one is working on the machine.
- ➢ Ensure that all service doors and panels are locked.

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.

- ➢ Work on electrical equipment may only be carried out by authorised electricians.
- ➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.
- ➢ Check that there is no voltage on floating relay contacts.

When working on the compressed air system

Compressed air is contained energy. Uncontrolled release of this energy can cause serious injury or death. The following safety concerns relate to any work on components that could be under pressure.

- ➢ Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- ➢ De-pressurise all pressurised components and enclosures.
- ➢ Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 bar.
- ➢ Do not open or dismantle any valves.

When working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.
Touching the fan wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

- ➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.
- ➢ Do not open the cabinet while the machine is switched on.

Further information

Details of authorised personnel are found in chapter 3.4.2.
Details of dangers and their avoidance are found in chapter 3.5.

7.2 Instructions to be observed before commissioning or re-commissioning

Incorrect or improper commissioning can cause injury to persons and damage to the machine.

➢ Commissioning may only be carried out by authorised installation and service personnel who have been trained on this machine.

Special measures for re-commissioning after storage

Storage period longer than:	Remedy
3 months	➢ Manually fill the airend with cooling oil.
12 months	➢ Change the oil filter. ➢ Change the oil separator cartridge. ➢ Change the cooling oil. ➢ Have the motor bearings checked by an authorised KAESER Service Technician.
36 months	➢ Have the overall technical condition checked by an authorised KAESER Service Technician.

Tab. 45 Re-commissioning after storage

7.3 Checking installation and operating conditions

➢ Check and confirm all the items in the checklist before starting the machine.

To be checked	See chapter	Confirmed?
➢ Are the operators fully conversant with safety regulations?	–	
➢ Have all the positioning conditions been fulfilled?	5	
➢ Is a user's lockable power supply disconnecting device installed?	6.4	
➢ Does the power supply conform to the specifications on the nameplate?	2.1	
➢ Are the power supply cable conductor cross-sections and fuse ratings adequate?	2.14	
➢ Drive motor overload protection switch set according to the mains voltage?	7.4	
➢ Option T2: Do the connections to the transformer correspond with the mains supply?	6.4.1	
➢ Have all electrical connections been checked for tightness?	–	
➢ Is a shut-off valve fitted to compressed air outlet?	6.3	
➢ Has the connection to the air system been made with a hose or axial compensator?	6.3	
➢ Is the condensate drain connected?	6.5	
➢ Has the drive belt tension been checked?	10.9	
➢ Is there sufficient cooling oil in the separator tank?	10.12	

To be checked	See chapter	Confirmed?
➢ Is there sufficient cooling oil in the airend?	7.5	
➢ Is the machine firmly anchored to the floor? (option H1)	6.7.1	
➢ Are door interlock switches aligned and their function checked?	7.7	
➢ Are all access doors closed and latched and all removable panels in place and secured?	–	

Tab. 46 Installation conditions checklist

7.4 Setting the overload protection cut-out

Electrical diagram 13.4 gives the location of the overload protection cut-out.

With star-delta starting, the phase current is fed via the overload protection cut-out. This phase current is 0.58-times the rated motor current.

To prevent the overload protection cut-out from being triggered by voltage fluctuations, temperature influences or component tolerances, the setting can be higher than the arithmetical phase current.

➢ Check the overload protection cut-out setting.

The overload protection cut-out shuts the machine down despite being correctly set?

➢ Contact KAESER Service.

7.5 Pouring cooling oil into the airend

Before starting the compressor for the very first time and before re-starting after a shutdown period of more than 3 months it is necessary to manually add a quantity of cooling oil into the airend. In order to avoid that the cooling oil exceeds the permissible level, drain the required quantity from the de-pressurised oil separator tank.
Chapter 10.15 provides detailed information on how to drain cooling oil from the oil separator tank.

Material 1l cooling oil

Precondition The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.

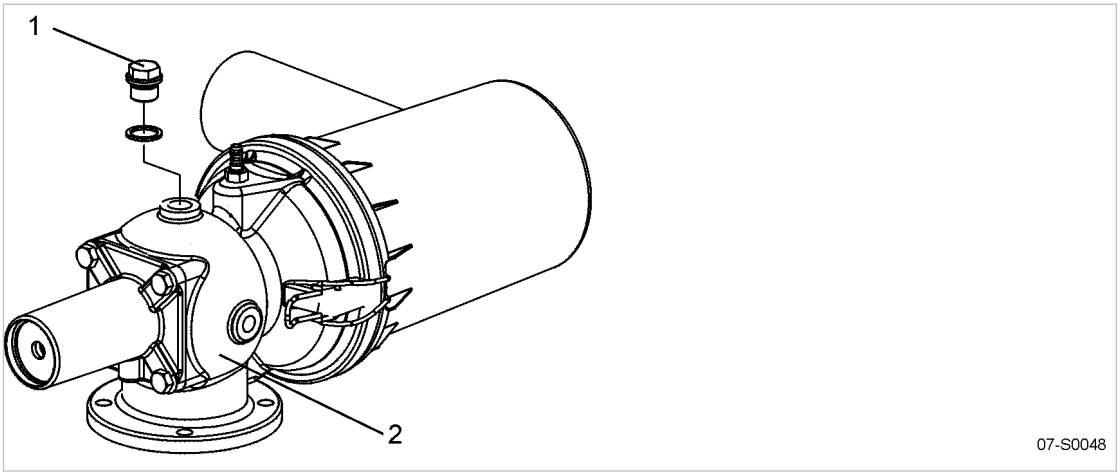


Fig. 13 Inlet valve filling port

[1] Screw plug
[2] Inlet valve

1. Unscrew the filler plug from the inlet valve.
2. Pour the stipulated amount of cooling oil into the airend and replace the filler plug.
3. Turn the airend manually by means of the belt pulley to distribute the oil.

7.6 Option C1
Activating and deactivating the MODULATING control

Use a shut-off valve to activate and deactivate the MODULATING control. If the MODULATING control is deactivated, the machine always delivers the maximum possible compressed air quantity in LOAD mode.

MODULATING control	Shut-off valve
switch on	open.
switch off	close

Tab. 47 MODULATING control: Setting the shut-off valve

Precondition The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.

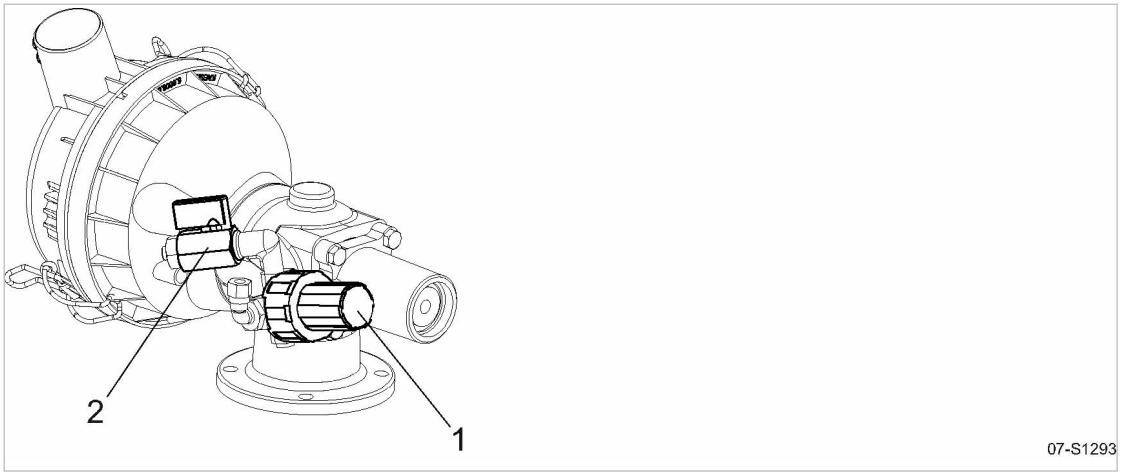


Fig. 14 MODULATING control: Setting the shut-off valve

[1] Control valve (proportional control)
[2] Shut-off valve

➢ Open or close the control valve, depending on the required control mode.

The control valve is factory set. The setting should not be changed without consultation with KAESER Service.

7.7 Checking the Door Interlock Switch

The interlock switch stops the machine as soon as the front access panel is opened.
Check the interlock switch function before every start-up.

The door interlock switch is an important safety device.
The machine may only be operated with a correctly functioning interlock switch.

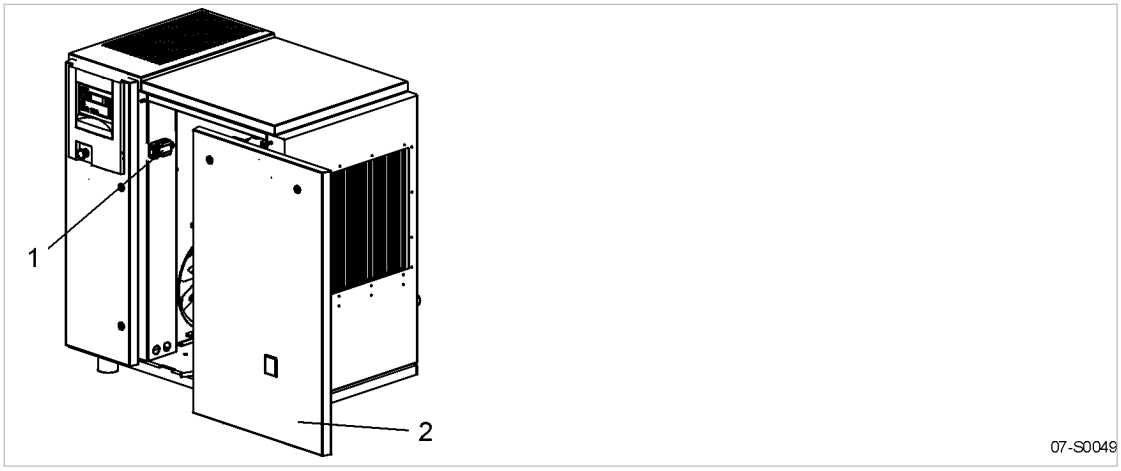


Fig. 15 Location of the interlock switch

[1] Door interlock switch
[2] Access panel

1. Open the access panel [2] while the machine is running.
   The machine shuts down automatically. The controller displays an alarm message.
2. Close the panel and acknowledge the alarm.

The machine does not shut down?

➢ Have the interlock switch checked by an authorised KAESER Service representative.

7.8 Starting the machine for the first time

Precondition
No personnel are working on the machine.
All access doors are closed.
All removable panels are in place and secured.

1. Open the shut-off valve to the air network.
2. Switch on the power supply isolating device.
   After the controller has carried out a self-test, the green *Control voltage* LED is lit continuously.
3. Press the «ON »key.
   The green *Machine ON* LED is lit continuously.
   The drive motor runs up and after a short time the machine switches to LOAD and delivers compressed air.

➢ Watch for any faults occurring in the first hour of operation.

➢ After the first 50 operating hours, check all electrical connections and tighten where necessary.

Does the machine stop when the compressor motor rotates in the wrong direction?

➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.

➢ Changeover phase lines L1 and L2.

7.9 Setting the setpoint pressure

The setpoint pressure (cut-out pressure) is factory set at the maximum permissible working pressure of the compressor.

Adjustment is necessary for individual operating conditions.

Do not set the setpoint pressure of the machine higher than the maximum working pressure of the compressed air system.

The machine may not toggle more than twice per minute between LOAD and IDLE.

To reduce the cycling (toggling) frequency:

➢ Increase the difference between cut-in and cut-out pressure.

➢ Add a larger air receiver downstream to increase buffer capacity.

Setpoint pressure: switching point

1. Scroll with the arrow keys until the parameter D "setpoint pressure: switch.point" is displayed in line 3.
2. Press and hold «enter» for at least 3 seconds until the cursor flashes.
3. Use the arrow keys to set the desired switching point and confirm with «enter».

Setpoint pressure: switching differential

This switching differential is factory set. Adjust this parameter if the motor starting frequency is too high.

1. Scroll with the arrow keys until the parameter C "setpoint pressure: switching differential" is displayed in line 3.
2. Press and hold «enter» for at least 3 seconds until the cursor flashes.
3. Use the arrow keys to set the desired differential and confirm with «enter».

8 Operation

8.1 Switching On and Off

Always switch the machine on with the «ON» key and off with the «OFF» key.

A power supply disconnecting device has been installed by the user.

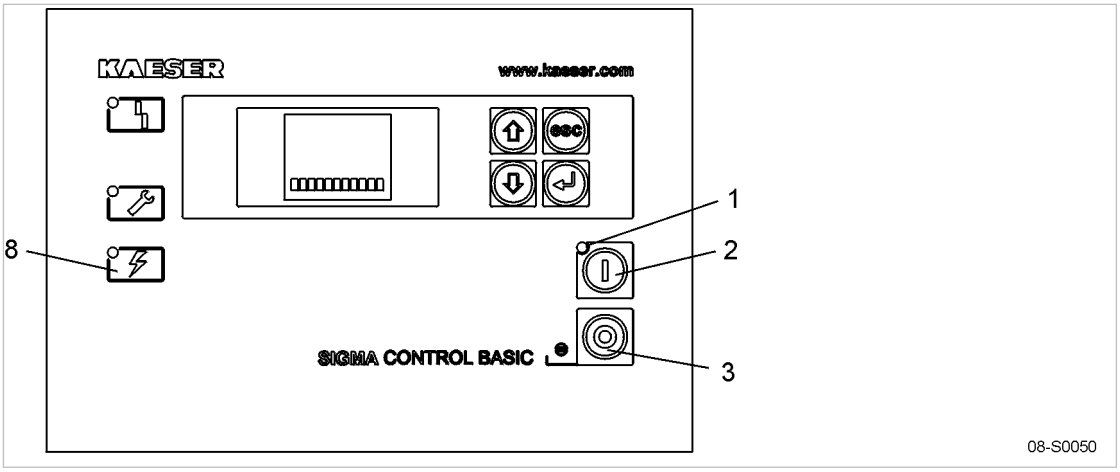


Fig. 16 Switching On and Off

1 *Machine ON* LED (green)
2 «ON» key
3 «OFF» key
8 *Controller ON* LED (green)

8.1.1 Switching on

Precondition No personnel are working on the machine,

All access doors and panels are closed and secure.

1. Switch on the power supply disconnecting device.
   After the controller has carried out a self-test, the green *Power ON* LED lights continuously.
2. Press the «ON» key.
   The green *Machine ON* LED lights continuously.

If a power failure occurs, the machine is **not** prevented from automatic re-starting.
It can start automatically again as soon as power is restored.

Result The compressor motor starts as soon as system pressure is lower than the setpoint pressure (cut-out pressure).

8.1.2 Switching off

Depending on current operating condition, the machine shuts down after a protective run-on period.

LOAD	IDLE
The machine switches to IDLE. The *Machine ON* LED flashes. The drive motor comes to a stop after about 15 seconds. The *Machine ON* LED extinguishes.	The motor stops immediately. The *Machine ON* LED extinguishes.

Tab. 48 Switching off with/without run-on time.

1. Press the «OFF» key.
   The machine is ready to operate as soon as the *Machine ON* LED is extinguished. The machine can be started again.
2. Switch off and lock out the power supply disconnecting device.
   The machine is switched off and isolated from the mains supply. The *Controller Power* LED extinguishes.

8.2 Switching off in an emergency and switching on again

The EMERGENCY STOP push-button is located below the control panel.

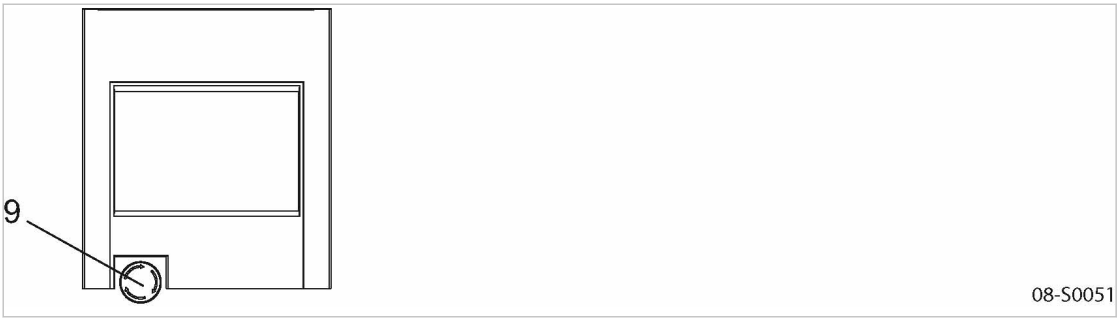


Fig. 17 Switching off in an emergency
9 EMERGENCY STOP control device:

Switching off

➢ Press the EMERGENCY STOP control device.

Result The EMERGENCY STOP button remains latched after actuation.
The compressor's pressure system is vented and the machine is prevented from automatically restarting.

Switching on

Precondition The fault has been rectified

1. Turn the EMERGENCY STOP device in the direction of the arrow to unlatch it.
2. Acknowledge any existing alarm messages.

Result The machine can now be started again.

8.3 Setting parameters

If a password is needed it is requested automatically.

Every action can be cancelled with the «escape» key.

If no key is pressed for ten seconds in the edit mode, the display automatically returns to the previous mode.

Restarting the controller is not necessary. Edited parameters are immediately effective.

Network pressure and airend discharge temperature are neither updated nor displayed whilst in the edit mode.

Entering the edit mode

1. Scroll with the «UP»/«DOWN» keys until the desired parameter appears in line 3.
2. Depress the «enter» key for at least 3 seconds.

Result Depending on the parameter, either the displayed value or the the first character of the required password flashes.

Changing a parameter that is not password protected

Precondition The current parameter setting flashes.

➢ Use the «UP»/«DOWN» keys to change the value of the parameter and confirm with «enter».

Changing a password protected parameter

Some parameters can only be edited after a password has been entered.

Password: BASIC

This password will be automatically reset if no key is pressed within 5 minutes.

Precondition The first character flashes.

1. Select the first character with the «UP»/«DOWN» key and confirm with «enter».
   The next character flashes.
2. Repeat until all characters have been entered.
   When the correct password is entered the parameters are displayed.
3. Use the «UP»/«DOWN» keys to change the value of the parameter and confirm with «enter».

8.4 Acknowledging alarm and warning messages

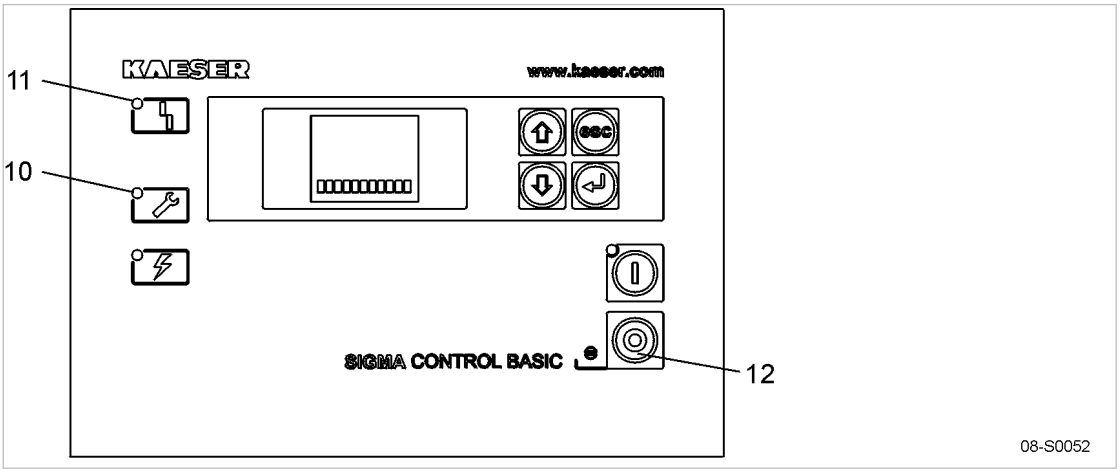


Fig. 18 Acknowledging messages

[10] *Warning* LED (yellow)
[11] *Alarm* LED (red)
[12] «Acknowledge» key

Alarm message

Messages are displayed on the "new value" principle:

- Message received: LED flashes
- Message acknowledged: LED lights
- Message gone: LED extinguished

or

- Message received: LED flashes
- Message gone: LED flashes
- Message reset: LED extinguished

➢ Rectify the fault and acknowledge the message with the «acknowledge» key.
alarm LED extinguishes.
The machine is now ready to start again.

Warning message

- Message coming: LED flashes
- Message gone: LED extinguished

➢ Rectify fault or carry out maintenance.
The *Warning* LED extinguishes as soon as the cause of the warning is rectified.

9 Fault Recognition and Rectification

9.1 Basic instructions

The following tables are intended to assist in locating faults.

There are 3 types of fault:

- Alarm: red LED flashes - see chapter 9.2.
- Warning: yellow LED lights- see chapter 9.3.
- Other faults: no indication - see chapter 9.4.

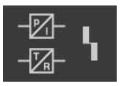
The messages valid for your machine are dependent on the controller and individual equipment.

1. Do not attempt fault rectification measures other than those given in this manual!
2. In all other cases:
   Have the fault rectified by an authorized KAESER service representative.

9.2 Alarm messages (machine shut down)

The fault code appears in the 4th line of the display field.
A sticker with symbols on the machine explains the fault code.

Fault code	Symbol	Meaning	Remedy
1		EMERGENCY STOP push-button pressed. Interlocked access door open or panel (if present) removed.	➢ Unlatch the EMERGENCY STOP push-button ➢ Close the access door or fit the panel.
2		Motor alarm Overload protection of drive or fan motor (if fitted). On machine with frequency-controlled drive: Alarm in the frequency converter.	➢ Check the setting of the overload protection cut-out / motor overload protection switch. ➢ Change the oil separator cartridge. ➢ Check minimum pressure/check valve. ➢ Have the frequency converter checked by an authorised KAESER service representative.
3		There is build-up of back pressure: ■ incorrect direction of motor rotation ■ drive belts parted ■ Compressor not venting correctly at STANDSTILL ■ Back-pressure switch defective Brief interruption of power supply.	➢ Changeover phase lines L1 and L2. ➢ Replace drive belts. ➢ Have the frequency converter checked by an authorised KAESER Service Technician.

Fault code	Symbol	Meaning	Remedy
4		Maximum permissible airend discharge temperature exceeded.	➢ Clean the radiator. ➢ Maintain sufficient distance between the cooling air inlet and exhaust openings and any wall. Check the cooling oil level. ➢ Ensure that the permissible room temperature is not exceeded. ➢ Change the oil filter.
5		Fault in the refrigeration dryer.	➢ Clean the refrigerant condenser. ➢ Ensure adequate ventilation. ➢ Install an extractor fan.
6		Defective analog input (pressure or temperature sensor).	➢ Check lines and connections.
7		Maximum permissible temperature of the controller housing exceeded.	➢ Ensure adequate ventilation. ➢ Ensure that the permissible room temperature is not exceeded.
8	–	Reserve	–

Tab. 49 Alarm indications

9.3 Warning messages

The fault code appears in the 4th line of the display field.
An adhesive label at the machine explains the fault code using symbols.

Fault code	Symbol	Meaning	Remedy
S		Maintenance counter has elapsed.	➢ Carry out maintenance.
p		Back pressure present.	➢ Check direction of drive motor rotation.
T		Machine below minimum permissible starting temperature.	➢ Increase room temperature.
i		Pressure relief valve check mode switched on.	➢ Check pressure relief valve. ➢ Deactivate check mode.

Tab. 50 Warning messages

9.4 Other Faults

Fault	Possible cause	Remedy
Machine runs but produces no compressed air.	Inlet valve not opening or only opening partially.	Call KAESER service representative.
	Venting valve not closing.	Call KAESER service representative.
	Leaks in the pressure system.	Check pipework and connections for leaks and tighten any loose fittings.
	Air consumption is greater than the capacity of the compressor.	Check the air system for leaks. Shut down the consumer(s).
	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
Cooling oil runs out of the air filter.	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Inlet valve defective.	Call KAESER service representative.
Compressor switches between LOAD and IDLE more than twice per minute.	Air receiver too small.	Increase size of air receiver.
	Airflow into the compressed air network restricted.	Increase air pipe diameters. Check filter elements.
	The differential between cut-in and cut-out pressure too is small.	Check switching differential.
Cooling oil leaking into the floor pan.	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
	Oil cooler leaking.	Call KAESER service representative.
	Leaking joints.	Tighten joints. Replace seals.
Cooling oil consumption too high.	Unsuitable oil is being used.	Use SIGMA FLUID cooling oil.
	Oil separator cartridge split.	Change the oil separator cartridge.
	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Oil return line clogged.	Check dirt trap in the return line.

Tab. 51 Other faults and actions

10 Maintenance

10.1 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

- ➢ Follow the instructions in chapter 3 'Safety and Responsibility'.
- ➢ Allow maintenance work to be performed by authorised personnel only.
- ➢ Make sure that no one is working on the machine.
- ➢ Ensure that all service doors and panels are locked.

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.

- ➢ Work on electrical equipment may only be carried out by authorised electricians.
- ➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.
- ➢ Check that there is no voltage on floating relay contacts.

When working on the compressed air system

Compressed air is contained energy. Uncontrolled release of this energy can cause serious injury or death. The following safety concerns relate to any work on components that could be under pressure.

- ➢ Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- ➢ De-pressurise all pressurised components and enclosures.
- ➢ Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 bar.
- ➢ Do not open or dismantle any valves.

When working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.
Touching the fan wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

- ➢ Switch off and lock out the power supply isolating device and verify the absence of voltage.
- ➢ Do not open the cabinet while the machine is switched on.

Further information

Details of authorised personnel are found in chapter 3.4.2.

Details of dangers and their avoidance are found in chapter 3.5.

10.2 Following the maintenance plan

10.2.1 Logging maintenance work

The maintenance intervals given are those recommended for average operating conditions.

➢ In adverse conditions, perform maintenance work at shorter intervals.

Adverse conditions are, e.g.:

- high temperatures
- much dust
- high number of load changes
- low load

➢ Adjust the maintenance intervals with regard to local installation and operating conditions.

➢ Documenting all maintenance and service work

This enables the frequency of individual maintenance tasks and deviations from our recommendations to be determined.

Further information A prepared list is provided in chapter 10.19.

10.2.2 Resetting maintenance interval counters

SIGMA CONTROL BASIC is equipped with a maintenance interval counter. The maintenance interval counter counts down the operating hours to the next maintenance task.

The counting down of the maintenance interval indicator shows when the next maintenance action is due.

Reset the counter to the original value once the task has been carried out.

1. Select parameter 2 (maintenance interval counter) with the «UP»/«DOWN» keys.
2. Depress the «Enter »key for at least 3 seconds.
3. When the cursor flashes, confirm the offered value with the «Enter» key.

10.2.3 Regular Maintenance Tasks

The table below lists maintenance tasks required.

The refrigeration circuit is a closed unit. Repairs may only be carried out by certified personnel.

➢ Take note of the controller's service messages and carry out tasks punctually, taking ambient and operating conditions into account.

Interval	Maintenance task	see chapter
weekly	Check belt tension.	10.9
	Check the cooling oil level.	10.12
	Cooler: Check the filter mat	10.3
	Control cabinet: Check the filter mat	10.4
	Check the condensate drain.	10.18.2
h = operating hours		

Interval	Maintenance task	see chapter
Up to 1,000 h	Maintain the drive belt.	10.9
	Check the air filter.	10.7
	Clean the cooler.	10.5
	Cooler: Clean the filter mat.	10.3
	Control cabinet: Clean the filter mat.	10.4
	Clean the refrigerant condenser.	10.18.1
Display: SIGMA CONTROL BASIC	Change the air filter element.	10.7
	Cooler: Change the filter mat	10.5
	Control cabinet: Change the filter mat	10.4
Display: SIGMA CONTROL BASIC At least annually	Change the oil filter.	10.16
	Change the oil separator cartridge.	10.17
Variable, see table 53	Change the cooling oil.	10.15
Annually	Check the pressure relief valve.	10.10
	Check the overheating safety shutdown function.	10.11
	Check the cooler for leaks.	10.5
	Maintain the heat recovery system.	10.6
	Check that all electrical connections are tight.	–
	Have the refrigerant circuit checked and documented by an authorised KAESER Service Technician.	–
	Have the safety pressure switch checked by an authorised KAESER Service Technician.	–
Up to 12,000 h	Replace the drive belt.	10.9
h = operating hours		

Tab. 52 Regular Maintenance Tasks

10.2.4 Cooling oil: Change interval

Duty cycles and ambient conditions are important factors influencing the number and length of the oil change intervals.

KAESER Service will support you in determining suitable intervals and provide information on the possibilities of oil analysis.

➢ Observe national regulations regarding the use of cooling oil in oil-injected rotary screw compressors.

➢ Check operating conditions and adjust intervals as necessary; log the results in table 53 for future reference.

	Maximum permissible oil change interval [operating hours/years]		
SIGMA FLUID	Favourable operating conditions*	Unfavourable operating conditions	My operating conditions
S-460	6 000**/2	4 000/1	
S-570	6 000**/2	4 000/1	
MOL	3 000/1	2 000/1	
FG-460	3 000/1	2 000/1	
FG-680	3 000/1	2 000/1	
PANOLIN HLP SYNTH 46	3 000/1	2 000/1	

* Cool to moderate ambient temperatures, low humidity, high duty cycle

** Changing intervals of > 6000 operating hours are not permissible without an oil analysis.

Tab. 53 Cooling oil: Change intervals

10.2.5 Regular service tasks

The table below lists necessary service tasks.

➢ Only an authorised KAESER Service Technician should carry out service work.

➢ Have service tasks carried out punctually taking ambient and operating conditions into account.

Interval	Service task
Up to 12,000 h	Have the valves checked.
up to 12,000 h, every three years at the latest	Check the drive motor bearings
up to 36,000 h, every six years at the latest	Have hose lines replaced. ■ Pressure pipes ■ Control air lines
h = operating hours	

Tab. 54 Regular service tasks

10.3 Cooler: Cleaning or Renewing the Filter Mats

The filter mats help to keep the cooler clean. If the filter mats are clogged, adequate cooling of the components is no longer ensured.

Material Filter mats:
Warm water and household detergent
Spare parts (as required)

Precondition The machine is switched off.

Fig. 19 Filter mat for the air and oil cooler

[1] Filter mat

No tools are needed to remove the filter mat.

1. Carefully remove the filter mat from the retaining frame.
2. Beat the mat or use a vacuum cleaner to remove loose dirt. If necessary, wash with lukewarm water and household detergent.
3. Change the filter mat if cleaning is not possible or if the change interval has expired.
4. Carefully insert the filter mat in the retaining frame.

10.4 Control cabinet: Clean or renew the filter mat

A filter mat is placed behind every ventilation grille. Filter mats protect the control cabinet from ingress of dirt. If the filter mats are clogged, adequate cooling of the components is no longer ensured. In such a case, clean or replace the filter mats.

Material Warm water and household detergent

Spare parts (as required)

Precondition The power supply isolating device is switched off,
the device is locked off,
the absence of any voltage has been verified.

The machine has cooled down.

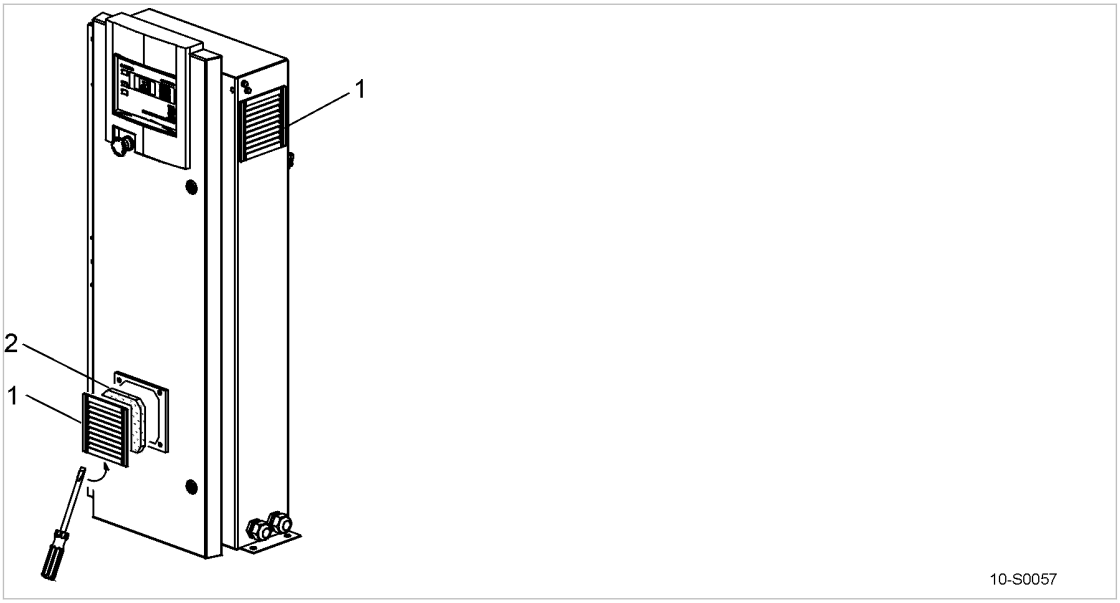


Fig. 20 Switching cabinet ventilation

[1] Ventilation grille
[2] Filter mat

1. Carefully remove the ventilation grille and take out the filter mat.
2. Beat the mat or use a vacuum cleaner to remove loose dirt. If necessary, wash with lukewarm water and household detergent.
3. Change the filter mat if cleaning is not possible or if the change interval has expired.
4. Insert the filter mat in the frame and latch in the ventilation grille.

10.5 Cooler maintenance

Regular cleaning of the cooler ensures reliable cooling of the machine and the compressed air. The frequency is mainly dependent on local operating conditions.

A leaking cooler results in loss of cooling oil and compressed air.

Clogged coolers are indicative of unfavourable ambient conditions. Such ambient conditions clog the cooling air ducts in the machine's interior and the engines resulting in increased wear and tear.

➢ Have the authorised KAESER Service clean the cooling air ducts.

Material Brush and vacuum cleaner
Face mask (as required)

Precondition The power supply isolating device is switched off,
the device is locked off,
the absence of any voltage has been verified.

The machine has cooled down.

Fig. 21 Filter mat for the air and oil cooler
[1] Filter mat

Cleaning the cooler

A filter mat helps to keep the cooler clean. Despite this fact, the cooler will clog over a period of time.

Do not use sharp objects to clean the cooler. It could be damaged.

Avoid creating clouds of dust.

1. Carefully remove the filter mat from the retaining frame.
2. Dry brush the oil and air coolers and use a vacuum cleaner to suck up the dirt.
3. Carefully insert the filter mat in the retaining frame.

The air and oil coolers can no longer be properly cleaned?

➢ Have severe clogging removed by an authorised KAESER Service Technician.

Checking the cooler for leaks

➢ Visual inspection: Did cooling oil escape?

Is a cooler leaking?

➢ Have the defective cooler repaired immediately by KAESER Service.

10.6 Option W1 Maintaining the external heat recovery system

Deposits in the heat exchanger can significantly reduce its capacity to transfer heat.

Check the heat exchanger regularly for leaks and contamination. Frequency of checking is dependant on the characteristics of the heat transfer medium.

➢ Have the external heat recovery system checked annually by KAESER Service.

10.7 Air Filter Maintenance

Check that all sealing surfaces match each other. The use of an unsuitable air filter element can permit dirt to ingress the pressure system and cause damage to the machine.

The air filter element cannot be cleaned.

Material Replacement part

Precondition The power supply disconnecting (isolating) device is switched off,
the disconnect device is locked in the off position,
a check has been made that no voltage is present.

The machine has cooled down.

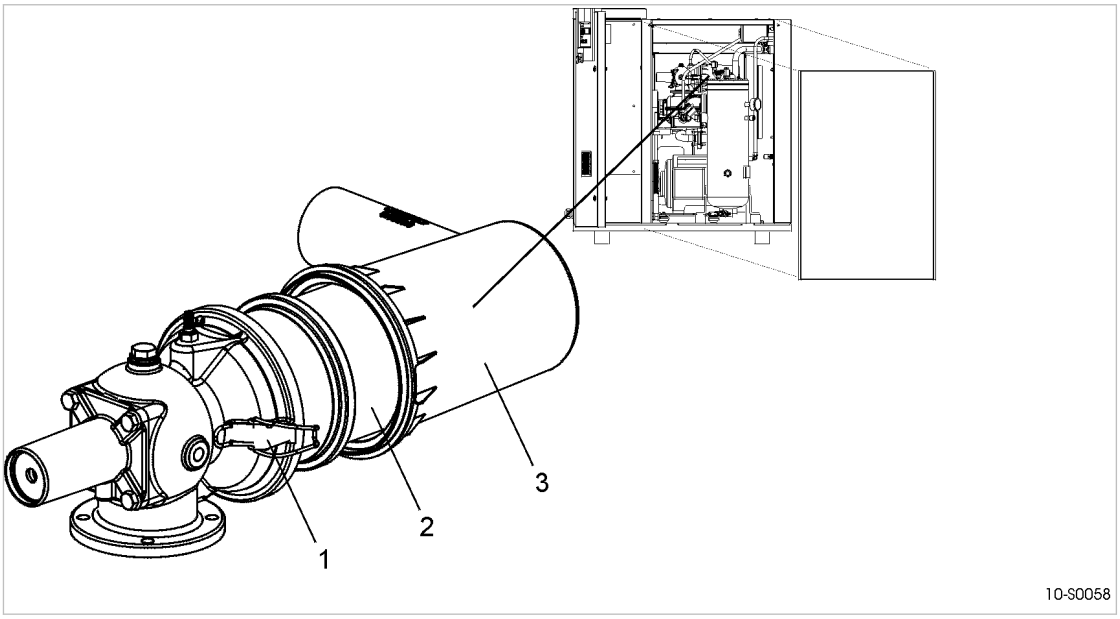


Fig. 22 Air filter maintenance

1. Snap fastener
2. Air filter element
3. Air filter housing

1. Release the spring clips and remove the element.
2. Clean all parts and sealing surfaces.
3. Insert the new element in the housing.
4. Clip the air filter housing onto the inlet valve.

10.8 Compressor motor maintenance

The drive motor bearings are permanently greased. Re-greasing is not necessary.

➢ Have the motor bearings checked by an authorised KAESER Service.

10.9 Maintaining the Drive Belts

Material Spare parts (if required)

Precondition The power supply disconnecting (isolating) device is switched off,
the disconnect device is locked in the off position,
a check has been made that no voltage is present.

The machine has cooled down.

WARNING
Touching rotating drive belts may result in severe bruising or even loss of limb or extremities.

➢ Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.

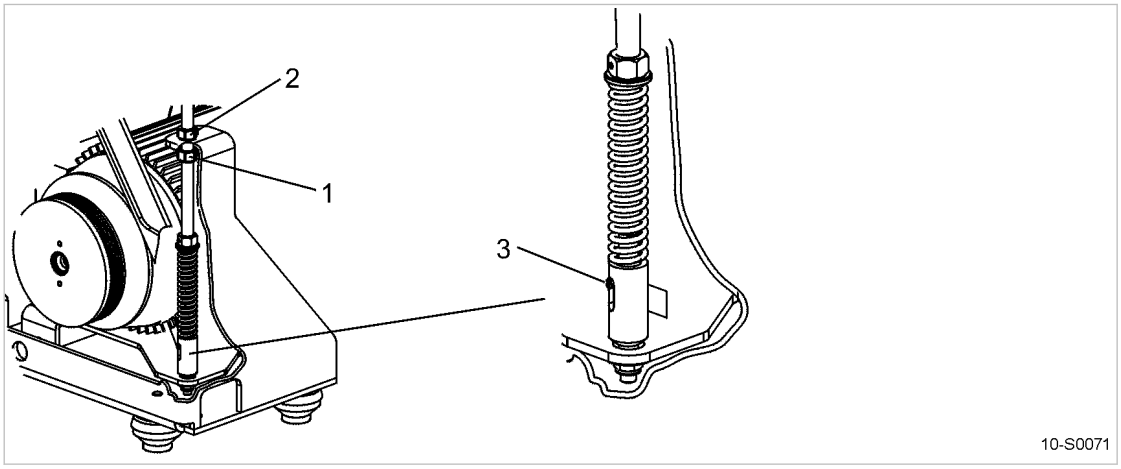


Fig. 23 Drive Belt Maintenance

[1] Adjusting nut
[2] Locking nut
[3] Marker pin (the illustration shows that belt tensioning is required)

Checking the belt tension and adjustment

The tensioning device uses spring force to apply correct tension to the belts.

Adjust the tension when the marker pin reaches the **top** of the elongated hole.

1. Loosen the locking nut [2].
2. Use the adjusting nut [1] to adjust spring tension until the marker pin reaches the lower end of the elongated hole.
3. Tighten the locking nut [2].

Visual damage check

1. Turn the pulley by hand so that all of the belt can be inspected for damage.
2. Change any damaged belts immediately.

Changing the belts

1. Loosen the locking nut [2].

2. Turn adjusting nut [1] to loosen the tension on the belts until they can be removed from the pulley.
3. Install the new set of belts and use the adjusting nut [1] to adjust tension until the marker pin reaches the lower end of the elongated hole.
4. Tighten the locking nut [2].

10.10 Testing the pressure relief valve

In order to check the pressure relief valve, the machine's working pressure is raised above the blowoff pressure of the valve.

The controller is switched to pressure relief valve checking mode to carry out this check. This checking mode is intended for machines with maximum permissible working pressure less than 15 bar. Pressure relief valves in machines with permissible working pressures higher than 15 bar must be removed from the machine and tested on a special rig.

Blow off protection and air system pressure monitoring are switched off during the test.

- ➢ Never operate the machine without correctly functioning pressure relief valves.
- ➢ Relief valves on machines with maximum permissible working pressure of 15 bar should be tested only by KAESER Service.

The machine must be isolated from the compressed air network and completely vented before undertaking any work on the pressure system.

Preparation for the test

Precondition The machine is switched off.

1. Close the user's shut-off valve between the machine and the air distribution network.
2. Read off the activating pressure on the valve.
   (the activating pressure is usually to be found at the end of the part identification)
3. Scroll to parameter 3 "Pressure relief valve check mode" with the arrow keys and confirm by depressing the «Enter» key for at least three seconds.
4. Enter the password "“BASIC" and confirm with the «Enter» key.
5. Use the arrow keys to select parameter "on" and confirm.

Carrying out the check

The machine starts in IDLE as soon as it is switched on.
As long as the «ON» key is depressed and held, the machine will run in LOAD operating mode and pressure builds up in the oil separator tank. As soon as the «ON» key is released, the machine switches back to IDLE and switches automatically to STANDSTILL when the idling period has elapsed.

Precondition The machine is switched off.

1. **WARNING!**
   The pressure relief valve may blow off at any time!
   Excessive noise is caused when the pressure relief valve blows off!
   There is danger of scalding from hot oil.
   There is danger of injury from bursting components and compressed air!
   - ➢ Close all access doors and replace and secure all removable panels.
   - ➢ Wear ear and eye protection.
   - ➢ Abort the test if the working pressure reaches 10 % above the blowoff pressure of the valve.
2. Press the «ON» key for short time.
   The machine starts in IDLE.
3. Observe the pressure indication on the SIGMA CONTROL BASIC keep the «ON» key pressed.
4. Stop the test as soon as the pressure relief valve blows off or working pressure rises to 10 % above the activating pressure of the pressure relief valve.
5. If necessary, vent the machine and replace the defective pressure relief valve.

Returning the machine to operational

1. Call up the edit mode again and enter the password "BASIC".
2. Use the arrow keys to set the parameter to "off" and confirm with the enter key.
3. Open the user's shut-off valve between the machine and the air distribution network.

10.11 Checking the Excess Temperature Safety Shutdown Function

The machine should shut down if the airend discharge temperature reaches a maximum of 110 °C.

➢ Have the safety shutdown function checked by an authorized KAESER service representative.

10.12 Checking the cooling oil level

The sight glass allows a risk-free reading of the cooling oil level. The oil indicator should be fully filled with oil when the machine is at standstill. The correct oil level cannot be seen.

The ideal situation is with the oil level around the optimum mark when the machine is running.

Operating state	Minimum oil level	Maximum oil level
LOAD		

Tab. 55 Permissible cooling oil level under LOAD

In frequency-controlled compressors (SFC) the oil level indicator sis only accurate when the machine is running at or near maximum speed.
The lower the pressure at the compressed air outlet, the higher the speed.

Precondition The machine has been running at least 5 minutes under LOAD.

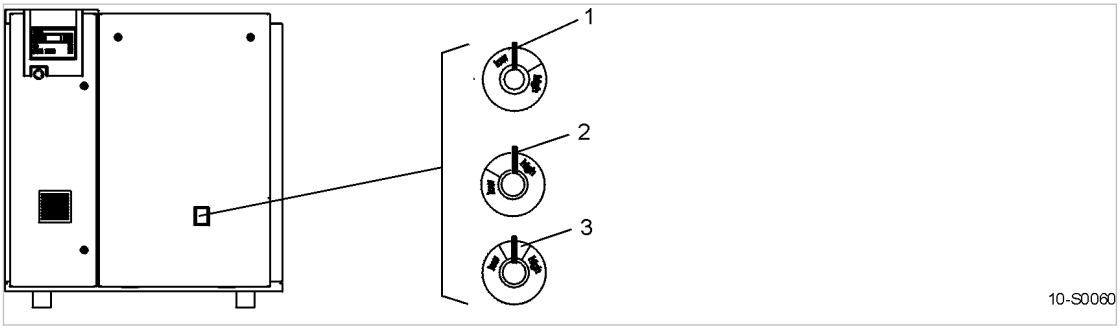


Fig. 24 Checking the cooling oil level

1 Minimum oil level
2 Maximum oil level
3 Optimum oil level

➢ Check the oil level with machine running under LOAD.

Result As soon as the minimum level is reached: Replenish the cooling oil.

10.13 Venting the machine (de-pressurising)

Venting takes place in three stages:

- Isolate the compressor from the air system.
- Vent the oil separator tank.
- Manually vent the air cooler.

The machine must be isolated from the compressed air network and completely vented before undertaking any work on the pressure system.

Material The maintenance hose with hose coupling and shut-off valve needed for venting is stowed beneath the oil separator tank.

Precondition The power supply isolating device is switched off,
the device is locked off,
the absence of any voltage has been verified.

CAUTION
Escaping oil mist is damaging to health.

➢ Do not direct the maintenance hose at persons while venting.

➢ Do not inhale the oil mist.

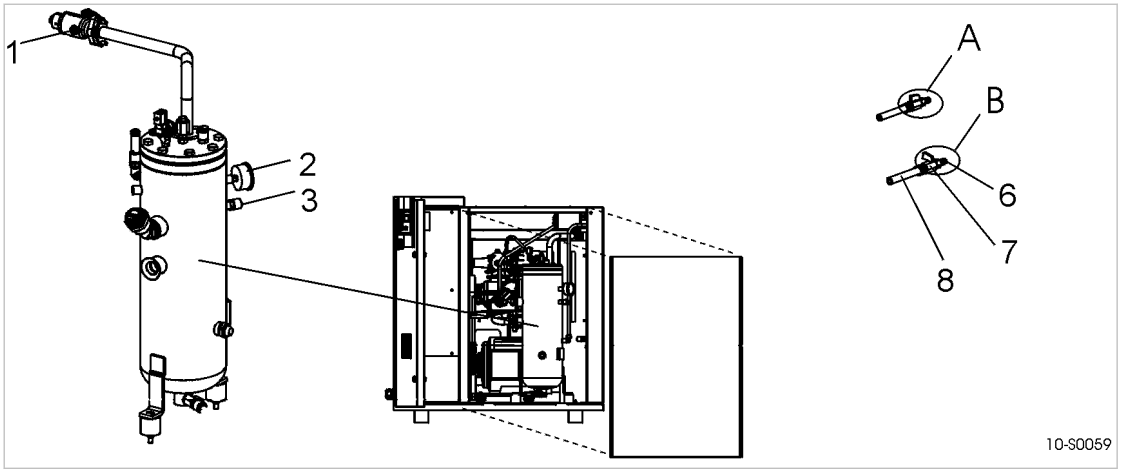


Fig. 25 Venting the machine

[1]	Hose coupling (air cooler venting)	[7]	Shut-off valve
[2]	Pressure gauge	[A]	Shut-off valve open
[3]	Hose coupling (oil separator tank venting)	[B]	Shut-off valve closed
[6]	Plug-in nozzle	[8]	Maintenance hose

Isolating the machine from the air system

➢ Close the user's shut-off valve between the machine and the air distribution network.

If no shut-off valve is provided by the user, the complete air network must be vented.

Venting the oil separator tank

The oil circulation vents automatically as soon as the machine is stopped.

➢ Check that the oil separator tank pressure gauge reads 0 bar.

The pressure gauge does not read 0 bar after automatic venting?

➢ Make sure that the shut-off valve is closed or that the complete air system is vented.

➢ With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [3].

➢ Slowly open the shut-off valve [7] to release pressure.

➢ Disconnect the male hose fitting [6] and close the shut-off valve [7].

➢ If manual venting does **not** bring the oil separator tank pressure gauge to zero: Contact the KAESER Service.

Manually venting the air cooler

After shutting down the compressor and venting the oil separator tank, the machine is still under pressure from the air system or the section from the shut-off valve to the minimum pressure/check valve.

1. With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [1].
2. Slowly open the shut-off valve [7] to release pressure.
3. Disconnect the male hose fitting [6] and close the shut-off valve [7].

10.14 Replenishing the cooling oil

The machine must be isolated from the compressed air network and completely vented before undertaking any work on the pressure system.

Material The maintenance hose with hose coupling and shut-off valve needed for venting is stowed beneath the oil separator tank.

Precondition The power supply isolating device is switched off,
the device is locked off,
the absence of any voltage has been verified.

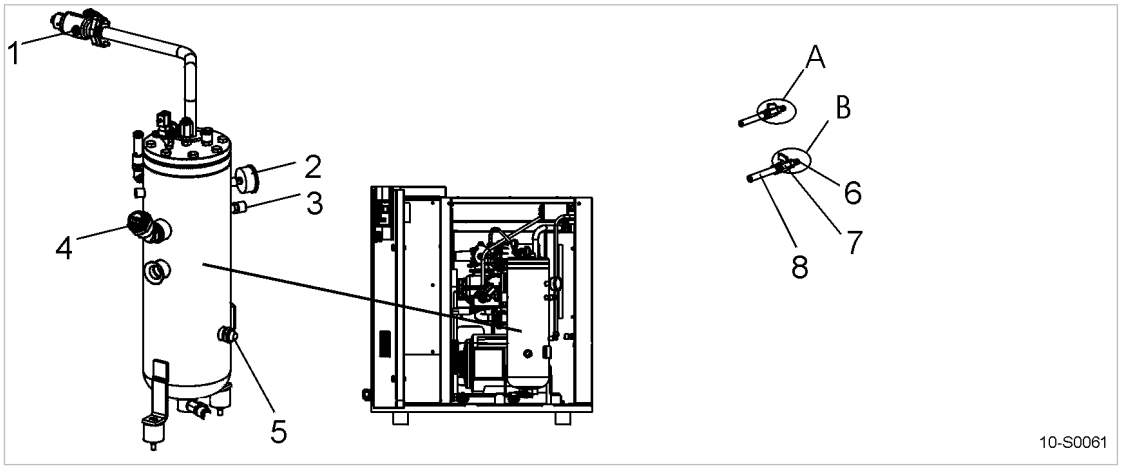


Fig. 26 Replenishing the cooling oil

1	Hose coupling (air cooler venting)	6	Plug-in nozzle
2	Pressure gauge	7	Shut-off valve
3	Hose coupling (oil separator tank venting)	A	Shut-off valve open
4	Oil filler port with plug	B	Shut-off valve closed
5	Cooling oil level indicator	8	Maintenance hose

1. Vent the machine as described in section 10.14.1.
2. Fill with cooling oil and test run as described in section 10.14.2.

10.14.1 Venting the machine (de-pressurising)

Venting takes place in three stages:

- Isolate the compressor from the air system.
- Vent the oil separator tank.
- Manually vent the air cooler.

CAUTION
Escaping oil mist is damaging to health.

➢ Do not direct the maintenance hose at persons while venting.

➢ Do not inhale the oil mist.

Isolating the machine from the air system

➢ Close the user's shut-off valve between the machine and the air distribution network.

If no shut-off valve is provided by the user, the complete air network must be vented.

Venting the oil separator tank

The oil circulation vents automatically as soon as the machine is stopped.

➢ Check that the oil separator tank pressure gauge reads 0 bar.

The pressure gauge does not read 0 bar after automatic venting?

➢ Make sure that the shut-off valve is closed or that the complete air system is vented.
➢ With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [3].
➢ Slowly open the shut-off valve [7] to release pressure.
➢ Disconnect the male hose fitting [6] and close the shut-off valve [7].
➢ If manual venting does **not** bring the oil separator tank pressure gauge to zero: Contact the KAESER Service.

Manually venting the air cooler

After shutting down the compressor and venting the oil separator tank, the machine is still under pressure from the air system or the section from the shut-off valve to the minimum pressure/check valve.

1. With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [1].
2. Slowly open the shut-off valve [7] to release pressure.
3. Disconnect the male hose fitting [6] and close the shut-off valve [7].

10.14.2 Topping up with cooling oil and trial run

Replenishing the cooling oil

A sticker on the oil separator tank specifies the type of oil used.

1. **WARNING!**
   Compressed air!
   Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.
   ➢ De-pressurise all pressurised components and enclosures.

2. *NOTICE!*
   The machine could be damaged by unsuitable oil!
   ➢ Never mix different types of oil.
   ➢ Never top up with a different type of oil to that already used in the machine.

3. Slowly unscrew the filler plug [4].
4. Top up to bring the oil to the correct level.
5. Renew the filler plug's gasket if necessary and screw the plug into the filler port.

Starting the machine and carrying out a trial run

1. Close all access doors, replace and secure all removable panels.

2. Open the user's shut-off valve between the machine and the air distribution network.
3. After approx. 10 minutes of operation: Check the cooling oil level and top up if necessary.
4. Switch off the machine and check visually for leaks.

10.15 Changing the cooling oil

Drain the oil completely from the following components:

- Oil separator tank
- Thermostatic valve (Option W1)

Always change the oil filter and oil separator cartridge when changing the oil.

Compressed air helps to expel the oil. This compressed air can be taken either from the compressor itself or from an external source.

An external source of compressed air is necessary in the following cases:

- The machine is not operational.
- The machine is to be restarted after a long period of standstill.

The machine must be isolated from the compressed air network and completely vented before undertaking any work on the pressure system.

Material Cooling oil

Cooling oil receptacle

The maintenance hose with hose coupling and shut-off valve is stowed beneath the oil separator tank.

CAUTION

There is risk of burns from hot components and oil!

➢ Wear long-sleeved clothing and gloves.

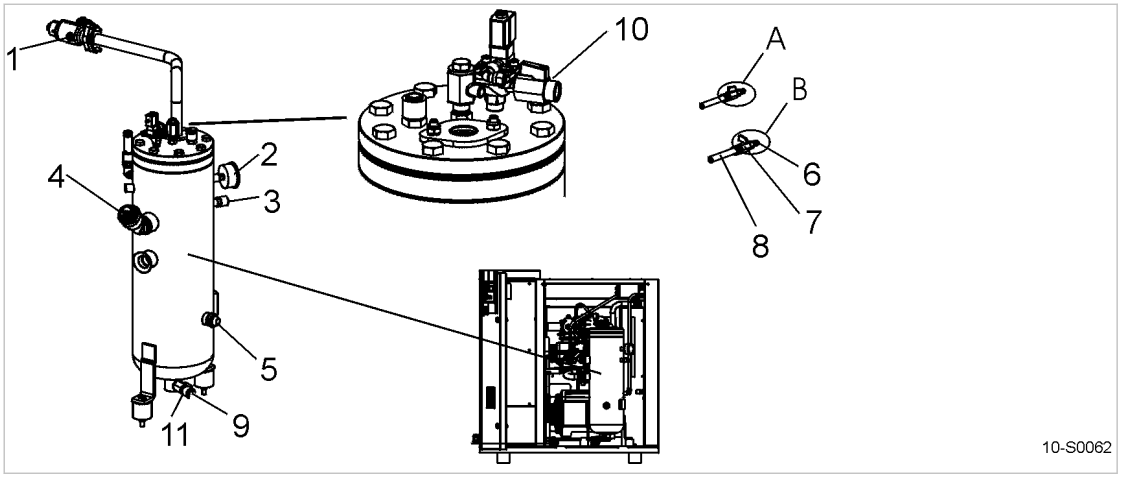


Fig. 27 Changing the cooling oil, oil separator tank

[1] Hose coupling (air cooler venting)
[2] Pressure gauge
[3] Hose coupling (oil separator tank venting)
[4] Oil filler port with plug
[5] Cooling oil level indicator
[6] Plug-in nozzle
[7] Shut-off valve
[A] Shut-off valve open
[B] Shut-off valve closed
[8] Maintenance hose
[9] Hose coupling (oil drain)
[10] Shut-off valve (venting line)
[11] Shut-off valve (oil drain)

Oil changing with help from internal pressure	Changing the oil using an external compressed air source
The machine has been running for at least 5 minutes under LOAD. The machine is fully vented, the pressure gauge on the oil separator tank reads 0 bar. 1. Close the shut-off valve [10] in the venting line. 2. Start the machine and watch the oil separator tank pressure gauge [2] until it reads 3–5 bar. 3. Switch off the machine. 4. Wait at least 2 minutes to allow the oil to flow back to the separator tank.	The supply disconnecting device is switched off, the device is locked off, the absence of voltage has been verified. The machine is fully vented, the pressure gauge on the oil separator tank reads 0 bar. An external source of compressed air is available. 1. Close the shut-off valve [10] in the venting line. 2. With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [3]. 3. Connect the maintenance hose to the external air supply. 4. Open the shut-off valve [7] until the pressure gauge on the oil separator tank reads 3–5 bar. 5. Close the shut-off valve [7] and remove the male hose fitting from the coupling.

Draining the oil from the separator tank

Contact KAESER Service if condensate is detected in the cooling oil.
It is necessary to adapt the airend discharge temperature to individual ambient conditions.

Precondition The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.

1. Have an oil receptacle ready.
2. With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [9].
3. Place the other end of the maintenance hose in the oil receptacle and secure it in place.
4. Open the shut-off valve [11].
5. Slowly open the shut-off valve [7] in the maintenance hose and allow oil and air to drain completely.
   Pressure gauge on the oil separator tank indicates 0 bar.
6. Close the shut-off valve [11] and unplug the male hose fitting.

➢ Dispose of used oil in accordance with environment protection regulations.

Option W1 Draining the oil from the thermostatic valve

A drain plug is provided to drain oil from the thermostatic valve. If the machine is connected to an external heat recovery system, oil should also be drained from the heat exchanger at a suitable point.

Precondition The external heat recover system is de-pressurised.

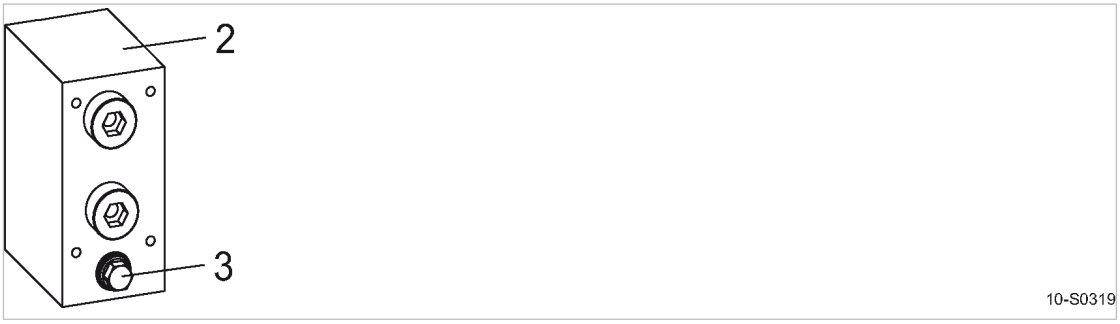


Fig. 28 Changing the cooling oil, heat recovery system
[2] Thermostatic valve
[3] Screw plug

1. Have an oil receptacle ready.
2. Remove the drain plug [3] and allow the oil to drain completely.
3. Replace the plug [3].

Filling with cooling oil

1. **WARNING!**
   Compressed air!
   Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.
   ➢ De-pressurise all pressurised components and enclosures.
2. Slowly unscrew the filler plug [4] (see illustration 27).
3. Fill with cooling oil.
4. Check the filler plug and ring seal for damage and screw the plug back in again.

Starting the machine and carrying out a trial run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the air distribution network.
3. Switch on the power supply and reset the maintenance interval counter.
4. Start the machine and check the oil level again after about 10 minutes, topping up if necessary.
5. Switch off the machine and check visually for leaks.

10.16 Changing the oil filter

The machine must be isolated from the compressed air network and completely vented before undertaking any work on the pressure system.

Material Spares

Cooling oil receptacle

Precondition The power supply isolating device is switched off,
the device is locked off,
the absence of any voltage has been verified.

The machine is fully vented,
the pressure gauge on the oil separator tank reads 0 bar.

CAUTION
There is risk of burns from hot components and oil!

➢ Wear long-sleeved clothing and gloves.

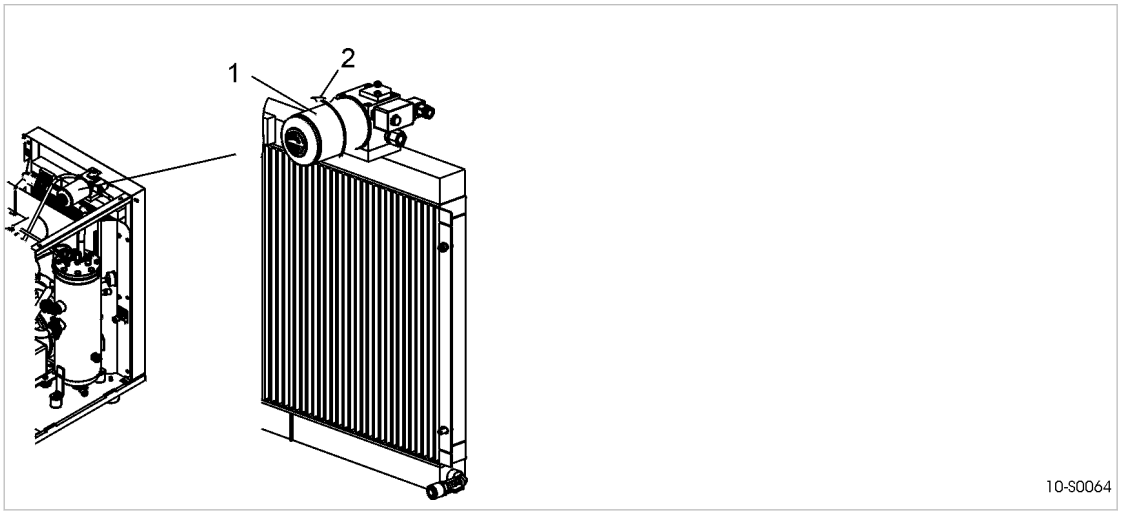


Fig. 29 Changing the oil filter

[1] Oil filter
[2] Direction to unscrew

Changing the oil filter

1. **WARNING!**
   Compressed air!
   Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.
   ➢ De-pressurise all pressurised components and enclosures.
2. Unscrew the oil filter anti-clockwise, catch oil spillage and dispose of in accordance with environmental protection regulations.
3. Lightly oil the new filter's gasket.
4. Turn the oil filter clockwise by hand to tighten.

➢ Dispose of parts and materials contaminated with oil in accordance with environmental protection regulations.

Starting the machine and carrying out a trial run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the air distribution network.
3. Switch on the power supply and reset the maintenance interval counter.
4. After approx. 10 minutes of operation: Check the cooling oil level and top up if necessary.
5. Switch off the machine and check visually for leaks.

10.17 Changing the oil separator cartridge

The oil separator cartridge cannot be cleaned.

The life of the oil separator cartridge is influenced by:

- contamination in the air drawn into the compressor,
- and adherence to the changing intervals for:
  - Cooling oil
  - Oil filter
  - Air filter

The machine must be isolated from the compressed air network and completely vented before undertaking any work on the pressure system.

Material: Spares
Cleaning cloth

Precondition: The power supply isolating device is switched off,
the device is locked off,
the absence of any voltage has been verified.
The machine is fully vented,
the pressure gauge on the oil separator tank reads 0 bar.

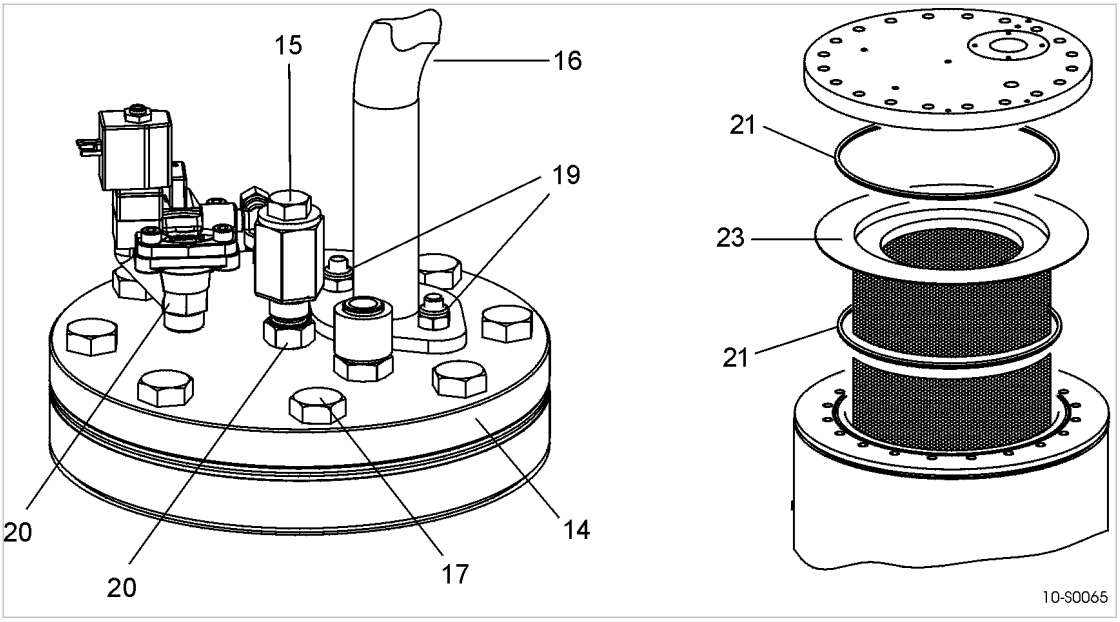


Fig. 30 Changing the oil separator cartridge

[14] Cover
[15] Dirt trap
[16] Air pipe
[17] Fixing screw
[19] Self-locking nut
[20] Screw fitting
[21] Gasket
[23] Oil separator cartridge

Changing the oil separator cartridge

1. **WARNING!**
   Compressed air!
   Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.
   ➢ De-pressurise all pressurised components and enclosures.
2. Unscrew the fitting [20] and carefully put the parts to one side, then pull out the copper pipe at item [15].
3. Unscrew the nut [19] and turn the air pipe [16] to one side.
4. Remove the cover fixing screws [17] and carefully remove the cover [14].
5. Take out the old oil separator cartridge [23] together with the gaskets [21] and dispose of according to environmental protection regulations.
6. Clean all sealing faces.
7. Insert the new oil separator cartridge with gaskets and screw down the cover.
8. Renew the O-ring and strainer in the dirt trap [15].
9. Attach the air pipe to the cover [14] with a new, self-locking nut.
10. Replace and tighten all fittings.

➢ Dispose of parts and materials contaminated with oil in accordance with environmental protection regulations.

Starting the machine and carrying out a trial run

1. Close all access doors; replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the air distribution network.

3. Switch on the power supply and reset the maintenance interval counter.
4. After approx. 10 minutes of operation: Switch off the machine and check visually for leaks.

10.18 Refrigeration Dryer Maintenance

The refrigeration circuit is fully hermetically sealed and needs no maintenance. Repairs may only be carried out by certified personnel.

Material
Compressed air for blowing out
Cleaning cloth
Vacuum cleaner
Spare parts (as required)

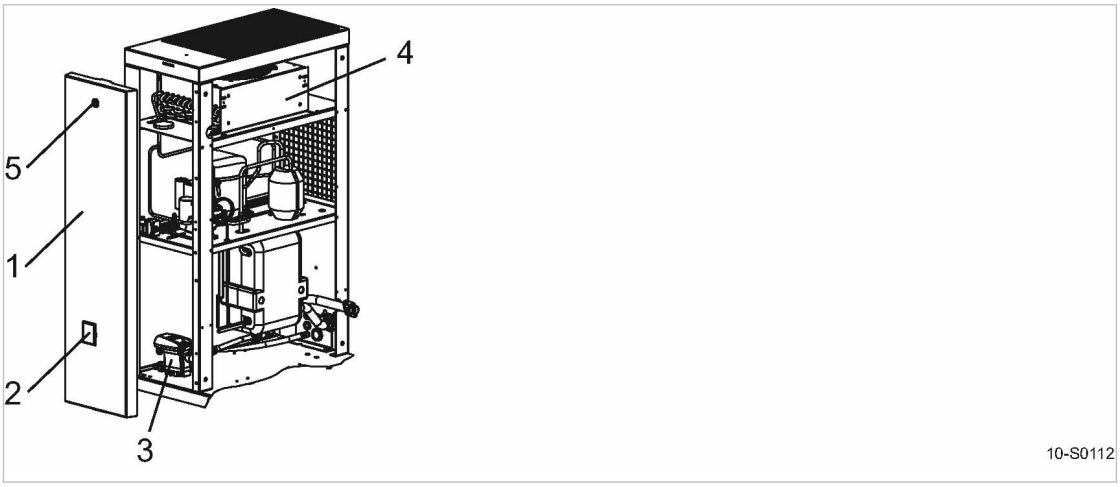


Fig. 31 Refrigeration dryer

[1] Access panel
[2] Sight glass: Condensate drain
[3] Condensate drain
[4] Refrigerant condenser
[5] Screws

➢ Check and clean the refrigerant condenser and condensate drain regularly as described below.

10.18.1 Cleaning the refrigerant condenser

Precondition
The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.

1. Undo the latch [5] and remove the panel [1].
2. Use compressed air (<5 bar) to blow the condenser [4] through from outside to inside and then vacuum up the dirt.
3. Replace the panel again.

10.18.2 Checking the condensate drain

The condensate drain opens automatically when enough condensate has collected.

One of the illustrated condensate drains is fitted according to compressor model (Fig 32).

Precondition The machine is shut down.

The *Power* LED lights.

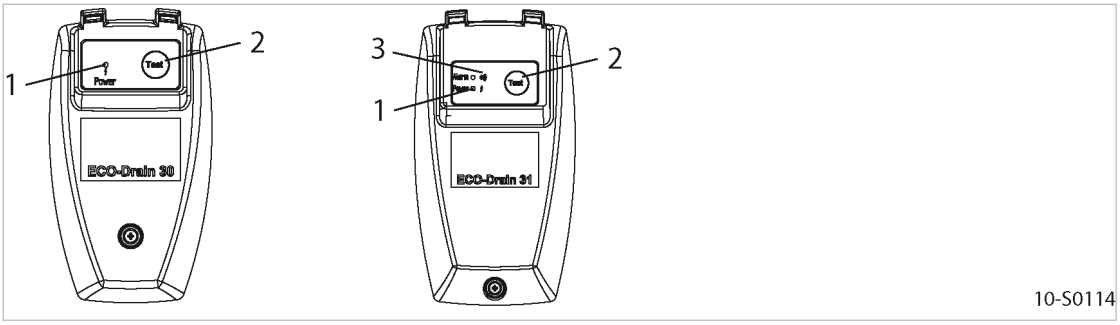


Fig. 32 Checking condensate drainage

1 *Power* LED
2 «TEST» key
3 *Alarm* LED

1. With one hand, lightly touch the condensate drain hose at the condensate drain.
2. With your other hand, push and hold the «TEST» key at the condensate drain for at least 2 seconds.

Result As soon as the condensate drain opens, you will feel a short burst at the condensate drain hose.

Service the condensate drain if you do **not** experience a burst..

10.18.3 Condensate drain maintenance

The condensate drain cannot be cleaned. The service unit must be changed if condensate does not drain.

Precondition The power supply isolator is switched off (all poles),
the device is secured to prevent switching back on,
the absence of voltage has been verified.

The *Power* LED is off (see Fig. 32).

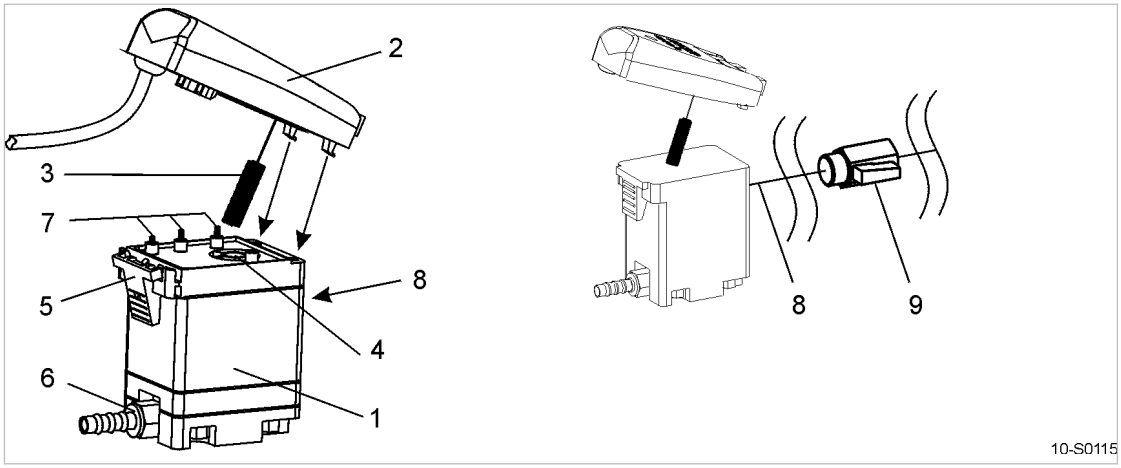


Fig. 33 Condensate drain maintenance

1. Service module
2. Control module
3. Sensor
4. Sensor opening
5. Snap fastener
6. Condensate drain hose fitting
7. Contact springs
8. Inlet
9. Shut-off valve

Removing the service module

1. Close the shut-off valve 9 upstream of the condensate drain.
2. Unscrew the drain hose fitting.
3. Press the snap fastener 5 and remove the control module carefully from the service module.
4. Carefully unscrew the service module from the inlet pipe.

Fitting the service module

Precondition Use only genuine KAESER service modules.

Make sure the top of the service module and the contact spring are clean and dry.

1. Screw the service module to the inlet pipe using sealing tape.
2. Carefully insert the control module sensor 3 in the opening 4 of the new service module.
3. Place the hook of the control module into the service module eye and press until the snap fastener can be heard to click into place.
4. Fit the drain hose and open the shut-off valve 9 upstream of the condensate drain.
5. Close all access doors, replace and secure all removable panels.

10.19 Documenting maintenance and service work

Machine number:

➢ Enter maintenance and service work carried out in the list.

Date	Maintenance task carried out	Operating hours	Signature

Tab. 56 Logged maintenance tasks

11 Spares, Operating Materials, Service

11.1 Note the Nameplate

The nameplate contains all information to identify your machine. This information is essential to us in order to provide you with optimal service.

➢ Please give the information from the nameplate with every enquiry and order for spares.

11.2 Ordering consumable parts and operating fluids/materials

KAESER consumable parts and operating materials are original Kaeser products. They are specifically selected for use in KAESER machines.

Unsuitable or poor quality consumable parts and operating fluids/materials may damage the machine or impair its proper function.

Personal injury may result from machine damage.

WARNING
There is risk of personal injury or damage to the machine resulting from the use of unsuitable spares or operating fluids/materials.

➢ Use only original KAESER parts and operating fluids/materials.

➢ Have an authorised KAESER Service Technician carry out regular maintenance.

Machine

Name	Quantity	Number
Air filter cartridge	1	1250
Filter mat (cooler)	1	1050
Filter mat (control cabinet)	2	1100
Oil filter	1	1200
Oil separator cartridge	1	1450
Cooling oil	1	1600
Drive belt	1	1801

Tab. 57 Consumable parts

11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

- authorised service technicians with KAESER factory training,
- increased operational reliability ensured by preventive maintenance,
- energy savings achieved by avoidance of pressure losses,
- optimum conditions for operation of the compressed air system,
- the security of genuine KAESER spare parts,
- increased legal certainty as all regulations are kept to.

➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

Result Your advantage:
lower costs and higher compressed air availability.

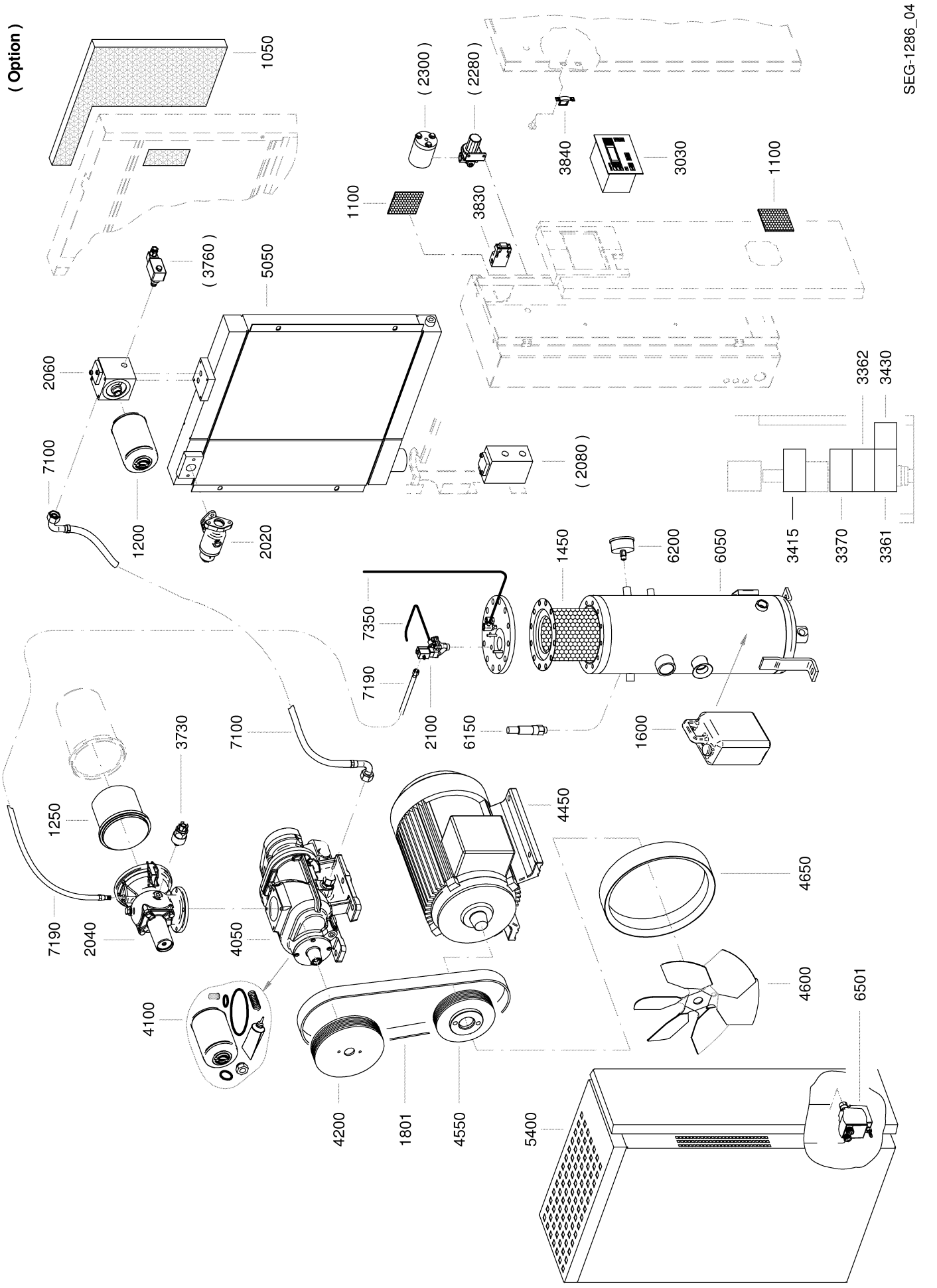
11.4 Service Addresses

Addresses of KAESER agents are given at the end of this manual.

11.5 Spare Parts for Service and Repair

Use this parts list to plan your material requirement according to operating conditions and to order the required spare parts.

➢ Make sure that any service or repair tasks not described in this manual are carried out by an authorised KAESER Service Technician.


(Option)
SEG-1286_04
1050
(2300)
(2280)
3840
3030
1100
1100
3830
(3760)
5050
2060
7100
1200
2020
(2080)
3362
3430
3415
3370
3361
1450
6200
6050
7350
7190
2100
6150
1600
3730
7100
1250
4450
4650
7190
2040
4050
4600
6501
4100
4200
1801
4550
5400

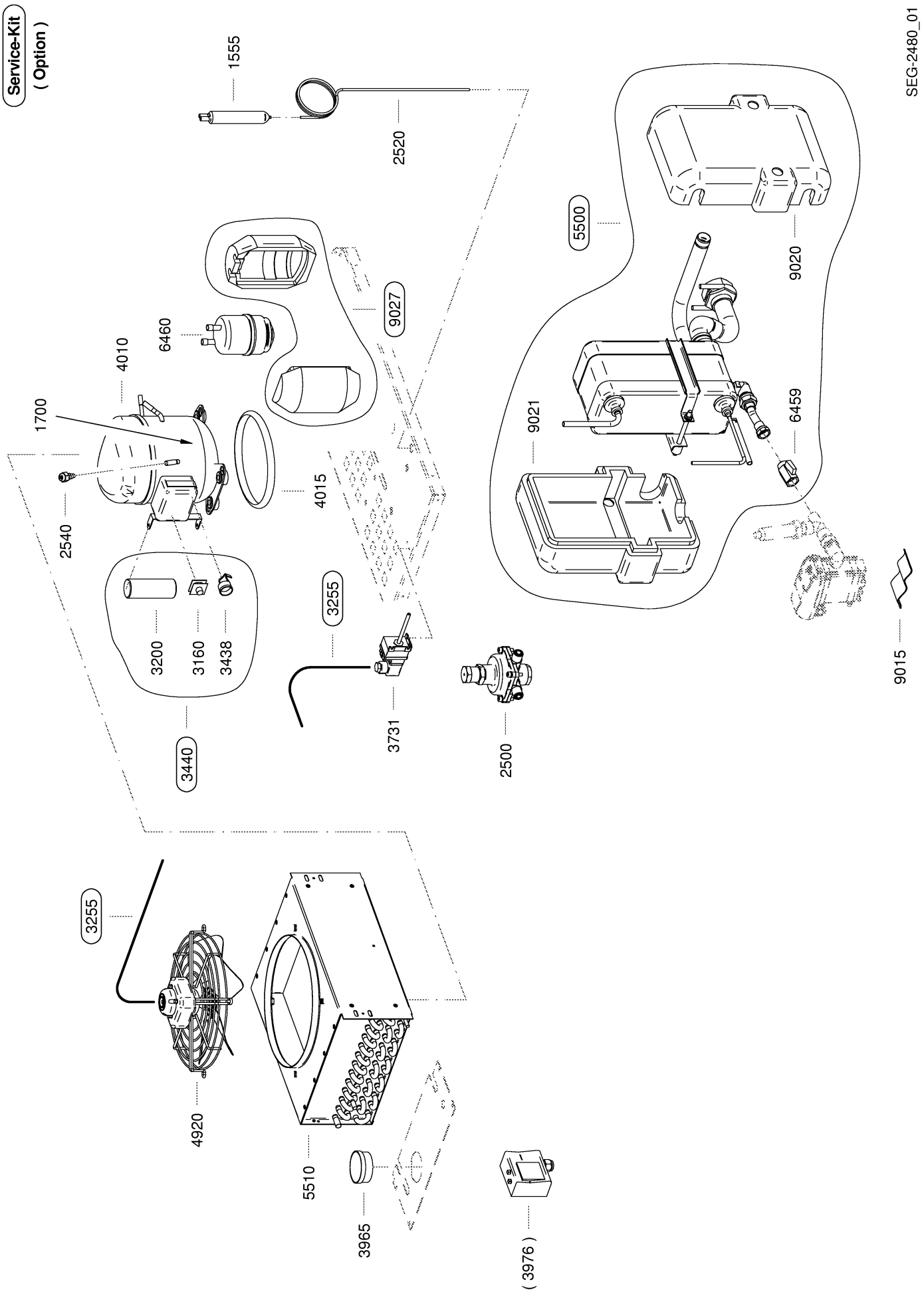
Legend	KAESER
ASK.2 T	SEL-1438_05E

Item	Description	Option
1050	Filter mat, cooling air	
1100	Filter mat, control cabinet	
1200	Oil filter	
1250	Air filter element	
1450	Oil separator cartridge	
1600	Sigma Fluid *)	
1801	Drive belt	
2020	Minimum pressure/check valve	
2022	Maintenance kit, MP/CV	
2024	Overhaul kit, MP/CV	
2040	Inlet valve	
2042	Maintenance kit, inlet valve	
2044	Overhaul kit, inlet valve	
2060	Combination valve	
2062	Maintenance kit, combi. valve	
2064	Overhaul kit, combination valve	
2080	Thermostatic valve	X
2082	Maintenance kit, thermostatic valve	
2084	Overhaul kit, thermostatic valve	
2100	Venting/control valve	
2102	Maintenance kit, VC valve	
2104	Overhaul kit, VC valve	
2280	Proportional controller	X
2300	Pneumatic valve	X
2302	Maintenance kit, pneumatic valve	
3030	SIGMA CONTROLLER	
3361	Mains contactor	
3362	Delta contactor	
3370	Star contactor	
3415	Contactor, dryer	
3430	Overload protection cutout	
3730	Rotating direction breaker	
3732	Protective cap	
3760	Pressure differential switch	X
3830	Safety interlock switch	
3840	Actuator (interlock switch)	
4050	SIGMA airend	
4100	Airend installation kit	
4200	Crankshaft pulley	
4450	Drive motor	
4451	Bearing set, drive motor	
4550	Drive motor pulley	
4600	Drive motor blower wheel	
4650	Fan spacer ring	
5050	Cooler	
5400	Refrigeration dryer	
6050	Oil separator tank	
6150	OST pressure relief valve	
6200	Oil sep. tank pressure gauge	
6501	Condensate drain, dryer	
9601	Maintenance kit, condensate drain	
9603	Gasket kit, condensate drain	
9605	Sealing element, control valve	
9607	Repair kit, control valve	
9611	Overhaul kit, condensate drain	
9625	Protective hood	
9629	Control board	
9631	Power unit	
7100	Hose line	
7190	Hose line	
7350	Control line kit	

Please quote the part number and serial number of the machine together with the item number and the description of the part when ordering.

Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual.

*) See cooling fluid recommendations


Service-Kit
(Option)
SEG-2480_01
1555
2520
5500
9020
9027
6460
4010
1700
9021
6459
4015
2540
3255
3200
3160
3438
9015
3731
2500
3440
3255
4920
5510
3965
(3976)

Legend	KAESER
Refrigeration dryer ABT	SEL-2321_01E

Item		Description	Option
1555	*	Filter dryer	
1700	*	Refrigerant	
2500	*	Hot gas bypass regulator	
2520	*	Capillary tube	
2540	*	Refrigerant filling port	
3160		Starter relay	
3200		Starting capacitor	
3255		Control cabinet cable set	
3438		Circuit breaker, refr. compr.	
3440		Switch set	
3731	*	Safety pressure switch	
3965		Temperature gauge	
3976		Thermostat	X
4010	*	Refrigerant compressor	
4015		Crank case heater	
4920		Fan unit	
5500	*	Heat exchanger	
5510	*	Refrigerant condenser cpl.	
6459		Shut-off valve	
6460	*	Refrigerant separator	
9015		Insulating tape	
9020		Insulating jacket	
9021		Insulating jacket	
9027		Condens. separator insulation	

Please quote the part number and serial number of the machine together with the item number and the description of the part when ordering.

Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual.

* The replacement of the spare parts described requires an authorized and certified refrigerant technician.

12 Decommissioning, Storage and Transport

12.1 Putting Out of Operation

This is necessary under the following circumstances:

- The machine is temporarily not needed.
- The machine is to be moved to another location.
- The machine is to be scrapped.

Temporarily putting out of operation

Precondition The machine can be started at regular intervals.

➢ Run the machine once a week for at least 30 minutes under LOAD to ensure sufficient protection against corrosion.

Putting out of operation for a longer period

Precondition Before putting out of operation, the machine should be run under LOAD for at least 30 minutes.

Switch off the mains disconnecting device,
the disconnect device is locked in the off position,
check that no voltage is present.

Machine fully vented (no pressure).

1. Allow the machine to cool down completely.
2. Disconnect all air and electrical connections.

12.2 Packing

A wooden crate is required for overland transport to protect the machine from mechanical damage.

Other measures must be taken for the transport of machines by sea or air. Please contact KAESER SERVICE for more information.

Material Desiccant
Plastic sheeting
Wooden crate

Precondition The machine is decommissioned.

The machine is dry and cooled down.

1. Place sufficient desiccant silica gel or desiccant clay) in the machine.
2. Wrap the machine fully in plastic sheeting.
3. Protect the machine in a wooden crate against mechanical damages.

12.3 Storage

Moisture can lead to corrosion, particularly on the surfaces of the airend and in the oil separator tank.

Frozen moisture can damage components, valve diaphragms and gaskets.

The following measures also apply to machines not yet commissioned.

Please consult with KAESER if you have questions to the appropriate storage and commissioning.

1. *NOTICE!*
   Moisture and frost can damage the machine!
   - ➢ Prevent ingress of moisture and formation of condensation.
   - ➢ Maintain a storage temperature of >0 °C.
2. Store the machine in a dry, frost-proof room.

12.4 Transport

12.4.1 Safety

Weight and centre of gravity determine the most suitable method of transportation. The centre of gravity is shown in the drawing in chapter 13.3.

- ➢ Please consult with KAESER if you intend to transport the machine in freezing temperatures.

Precondition Transport only using a forklift truck or lifting gear and only by personnel trained in the safe transportation of loads.

- ➢ Make sure the danger area is clear of personnel.

12.4.2 Transport with a forklift truck

Precondition The forks are fully under the machine.

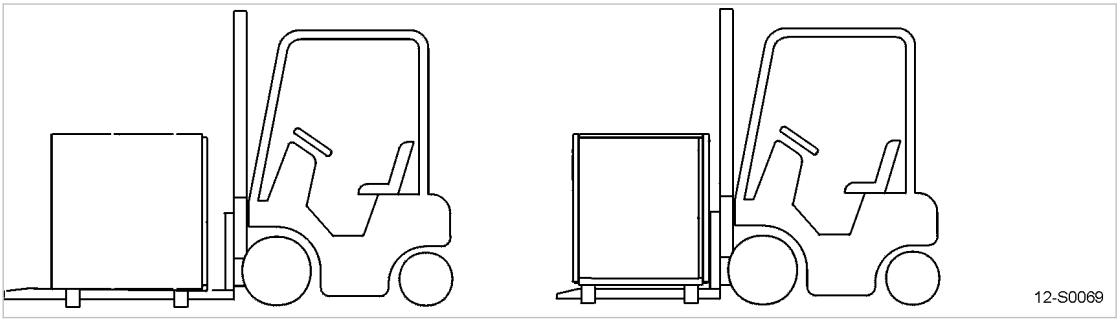


Fig. 34 Transport with a forklift truck

- ➢ Drive the forks completely under the machine or pallet and lift carefully.

12.4.3 Transport with a crane

Suitable lifting gear ensures correct transportation.
The lifting slings must be fed under the machine.
The slings may not bear on the side of the machine enclosure.

Examples of unsuitable fixing points:

- Pipe sockets
- Flanges

- Attached components such as cyclone separators, condensate drains or filters
- Rain protection covers

➢ Please consult with KAESER if you have questions to the appropriate lifting gear.

Precondition The lifting gear complies with local safety regulations.
No pressure should bear on the sides of the machine cabinet.

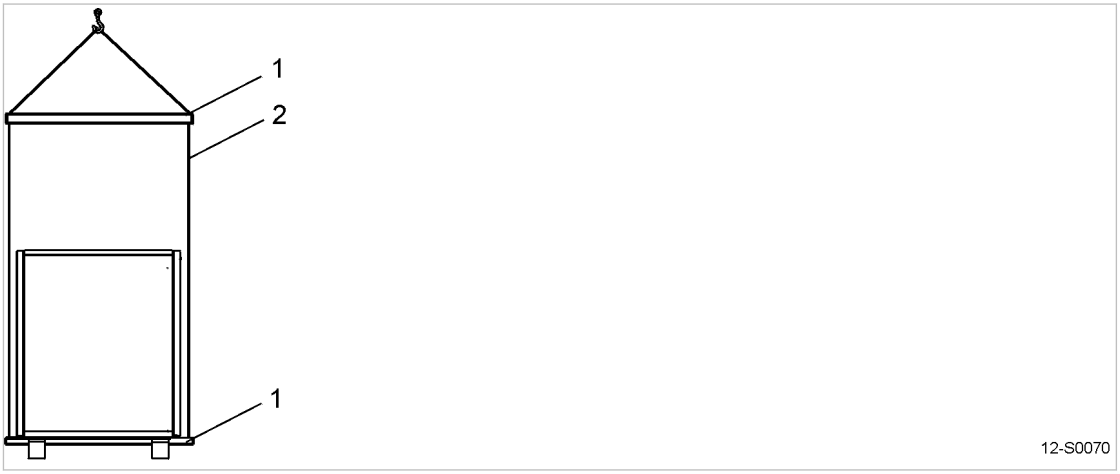


Fig. 35 Transport with a crane
[1] Lifting gear
[2] Slings

1. *NOTICE!*
   The machine can be damaged by incorrect attachment of the lifting gear!
   ➢ Do not attach the lifting gear to any of the machine components.
2. Use the lifting gear correctly and lift the machine carefully.

12.5 Disposal

When disposing of a machine, drain out all liquids and remove dirty filters.

Precondition The machine is decommissioned.

1. Completely drain the cooling oil from the machine.
2. Remove used filters and the oil separator cartridge.
3. Hand the machine over to an authorized disposal expert.

➢ Components contaminated with cooling oil must be disposed of in accordance with local environment protection regulations.

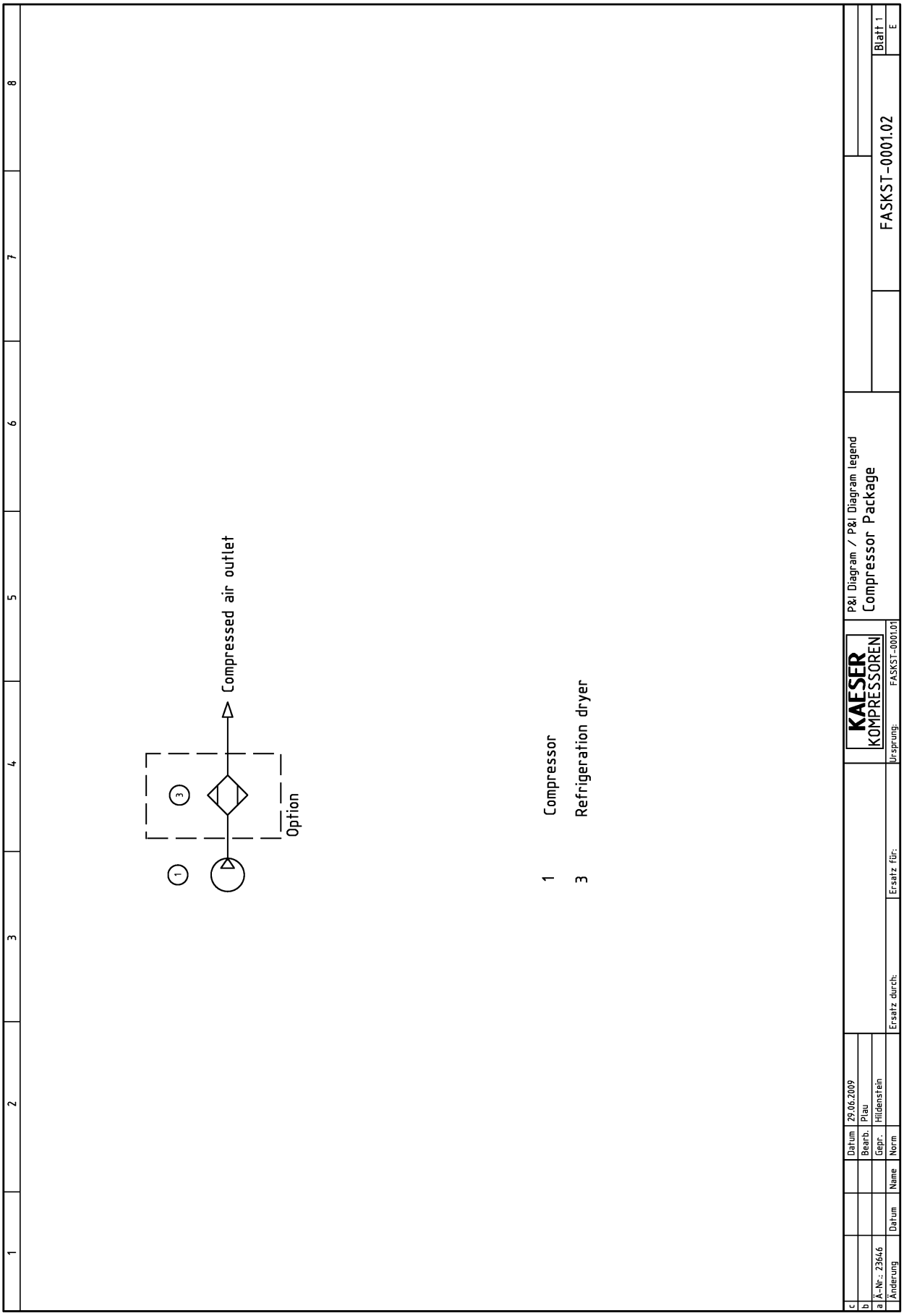
Machines with refrigeration dryers

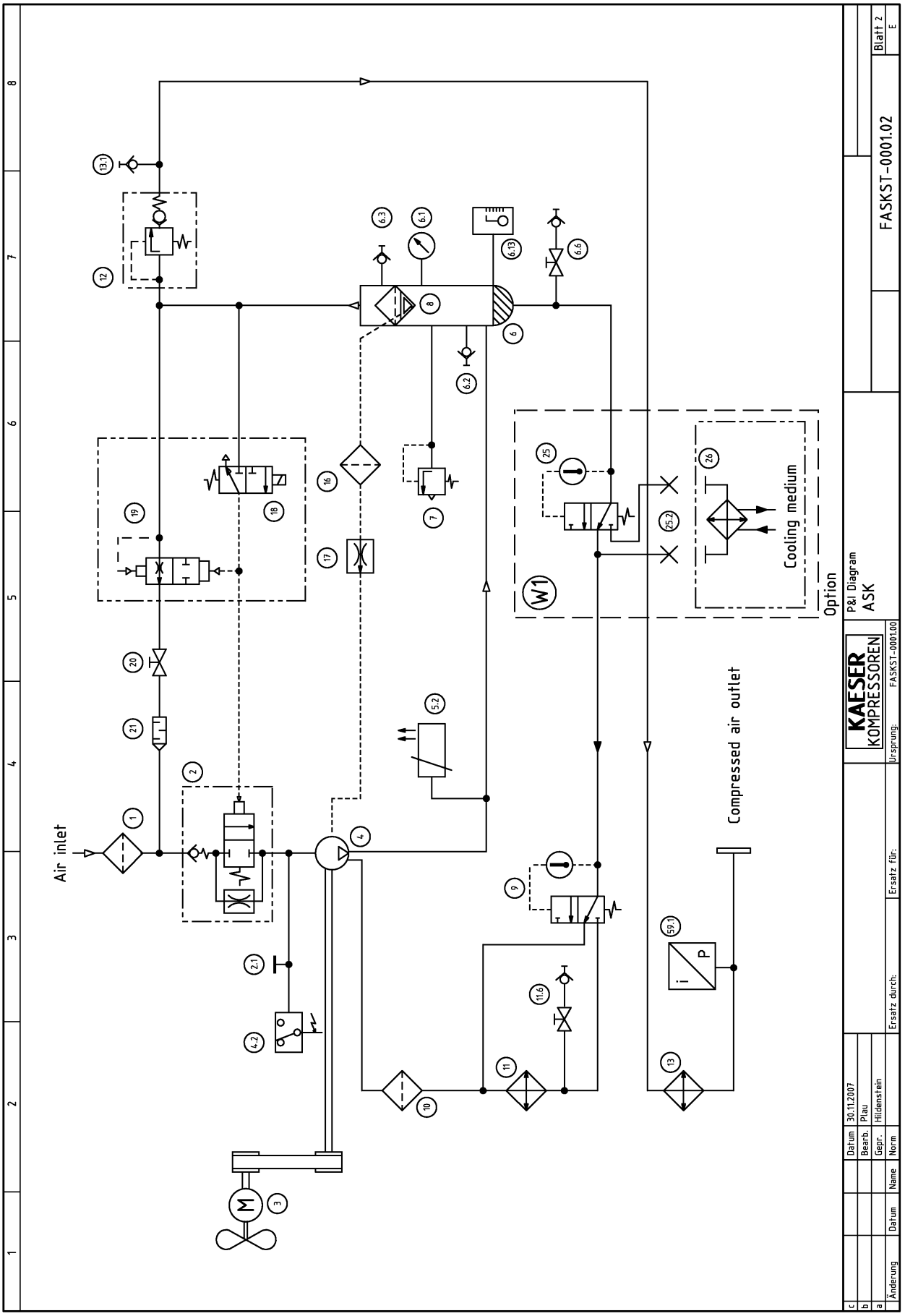
The sealed refrigerant circuit still contains both refrigerant and oil.

➢ Refrigerant and oil must be drained and disposed of by an authorized body.

13 Annex

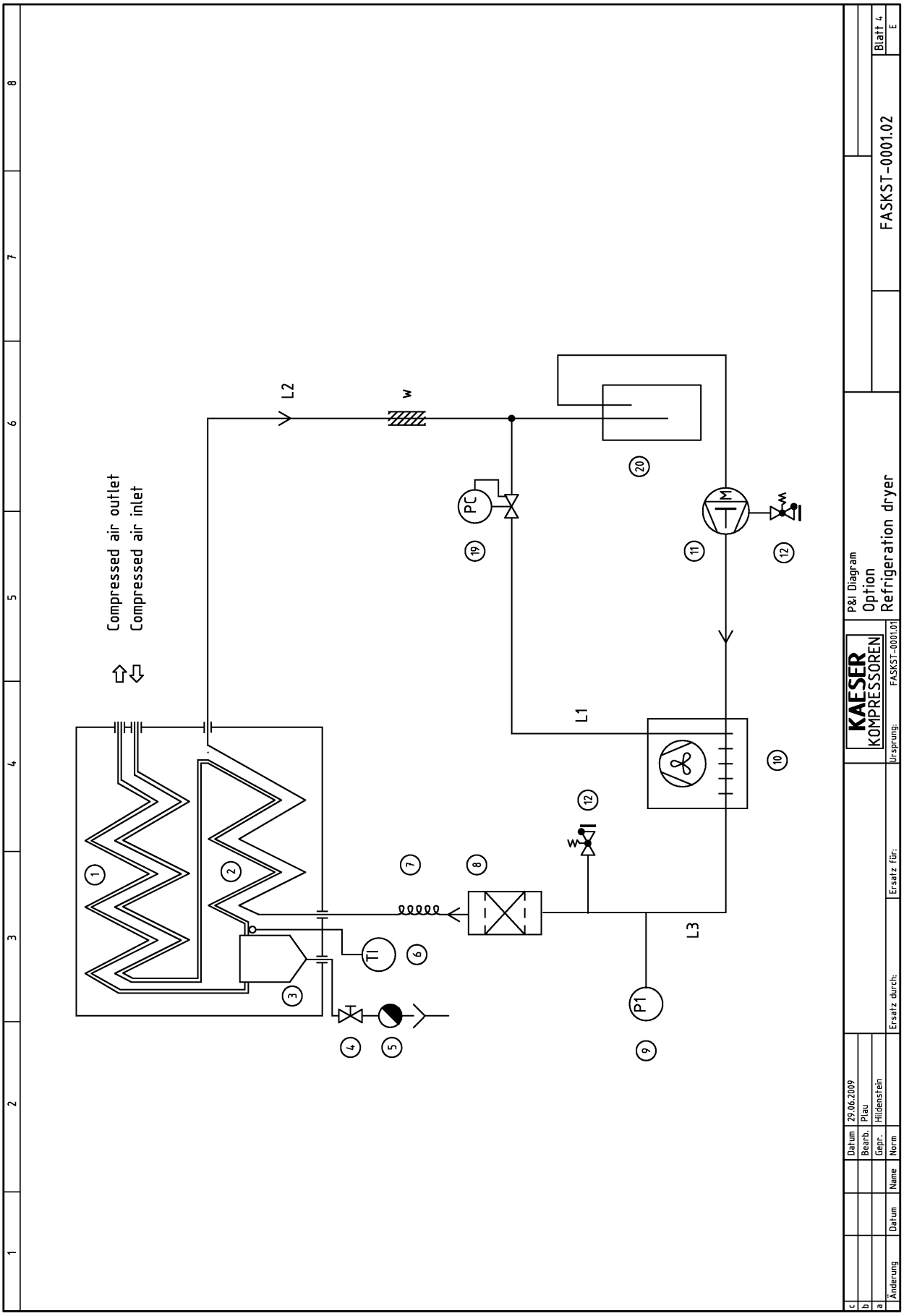
13.1 Pipeline and instrument flow diagram (P+I diagram)


Compressed air outlet
Option
1 Compressor
3 Refrigeration dryer
KAESER KOMPRESSOREN
P&I Diagram / P&I Diagram legend
Compressor Package
FASKST-0001.02
FASKST-0001.01
Blatt 1
E
Datum 29.06.2009
Bearb. Plau
Gepr. Hildenstein
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Name
Datum
A-Nr.: 23646


Air inlet
Compressed air outlet
Cooling medium
Option
W1
P&I Diagram
ASK
FASKST-0001.02
KAESER KOMPRESSOREN
Blatt 2
E
Ursprung:
Ersatz für:
Ersatz durch:
Datum
Name
Änderung
Bearb.
Gepr.
Norm
30.11.2007
Plau
Hildenstein

1	Air filter
2	Inlet valve
2.1	Oil filler with screw plug
3	Drive motor
4	Airend
4.2	Pressure switch - Wrong direction of rotation
5.2	PT100-sensor
6	Oil separator tank
6.1	Pressure gauge
6.2	Hose coupling (oil end)
6.3	Hose coupling (air end)
6.6	Shut-off valve with hose coupling - Oil drain
6.13	Oil level indicator
7	Pressure relief valve
8	Oil separator cartridge
9	Oil temperature controller
10	Oil filter
11	Oil cooler
11.6	Shut-off valve with hose coupling - Oil drain
12	Minimum pressure check valve
13	Air cooler
13.1	Hose coupling
16	Dirt trap
17	Nozzle
18/19	Combined control/venting valve
18	Control valve
19	Venting valve
20	Shut-off valve - Venting line
21	Silencer
25	Oil temperature thermostat for heat recovery system
25.2	Screw plug
26	Heat recovery system
59.1	Pressure transducer - System pressure
Option	
W1	Heat recovery system, external

c				Datum	29.06.2009		KAESER KOMPRESSOREN	P&I Diagram legend	
b				Bearb.	Plau			ASK	
a				Gepr.	Hildenstein				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FASKST-0001.01	FASKST-0001.02	Blatt 3 E


Compressed air outlet
Compressed air inlet
L1
L2
L3
PC
TI
P1
M
P&I Diagram
Option
Refrigeration dryer
FASKST-0001.02
KAESER KOMPRESSOREN
Blatt 4
E
Datum
Bearb.
Gepr.
Norm
29.06.2009
Plau
Hildenstein
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:
FASKST-0001.01

1	Air to air heat exchanger	heat insulated	
2	Air to refrigerant heat exchanger (Vapouriser)	heat insulated	
3	Condensate separator	heat insulated	
4	Shut-off valve		
5	Condensate drain		
6	Pressure dew point indicator TI		
7	Capillary tube (Refrigerant injection)		
8	Filter dryer		
9	Safety pressure switch		
10	Refrigerant condenser (air cooled condenser)		
11	Refrigerant compressor (hermetic)		
12	Service connection (Schrader valve)		
19	Hot gas bypass valve		
20	Refrigerant separator		

Piping:

L1	Bypass line
L2	CU-Pipe
L3	CU-Pipe
w	heat insulated

c				Datum	29.06.2009		
b				Bearb.	Plau		
a				Gepr.	Hildenstein		
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:

KAESER KOMPRESSOREN

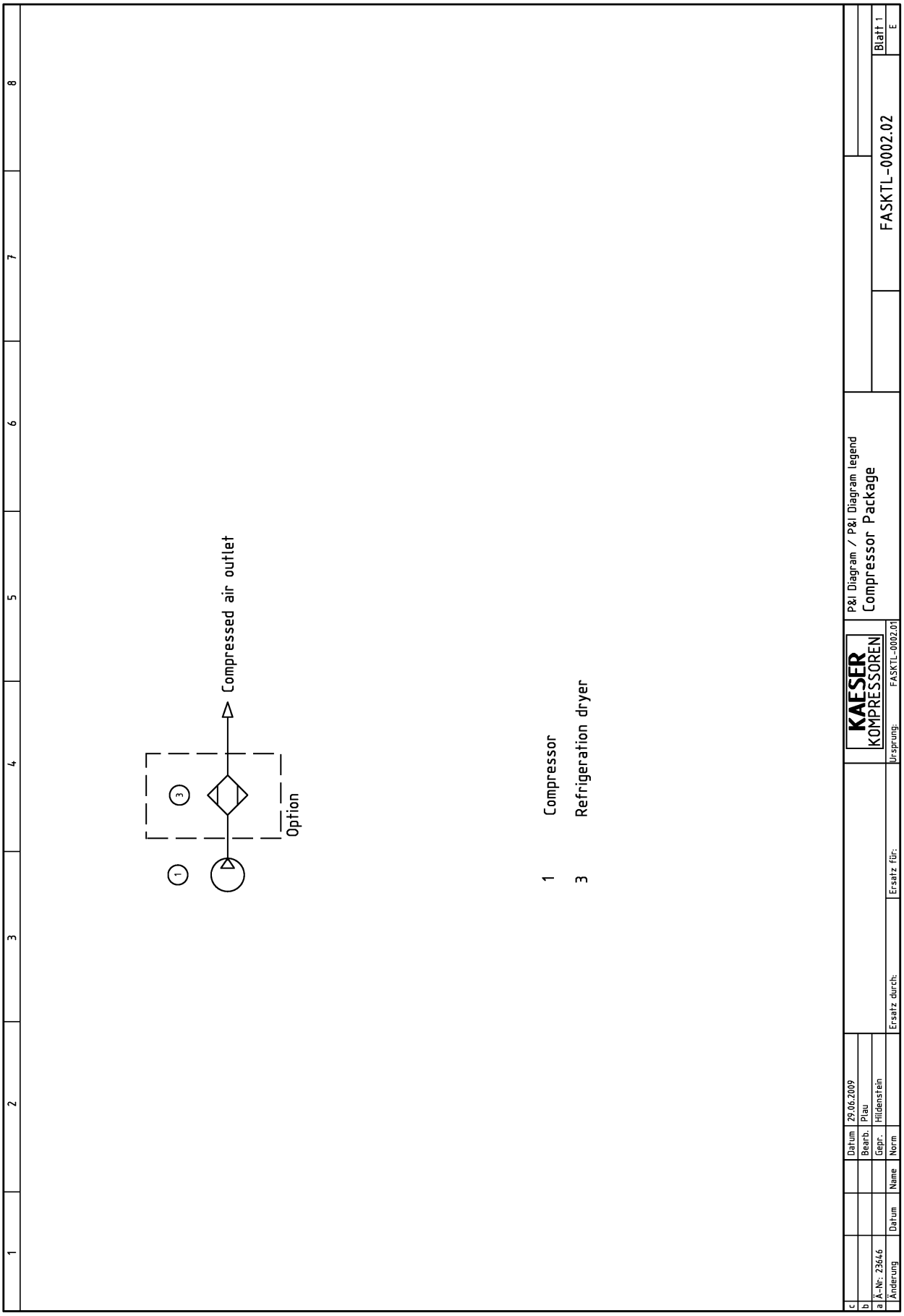
Ursprung: FASKST-0001.01

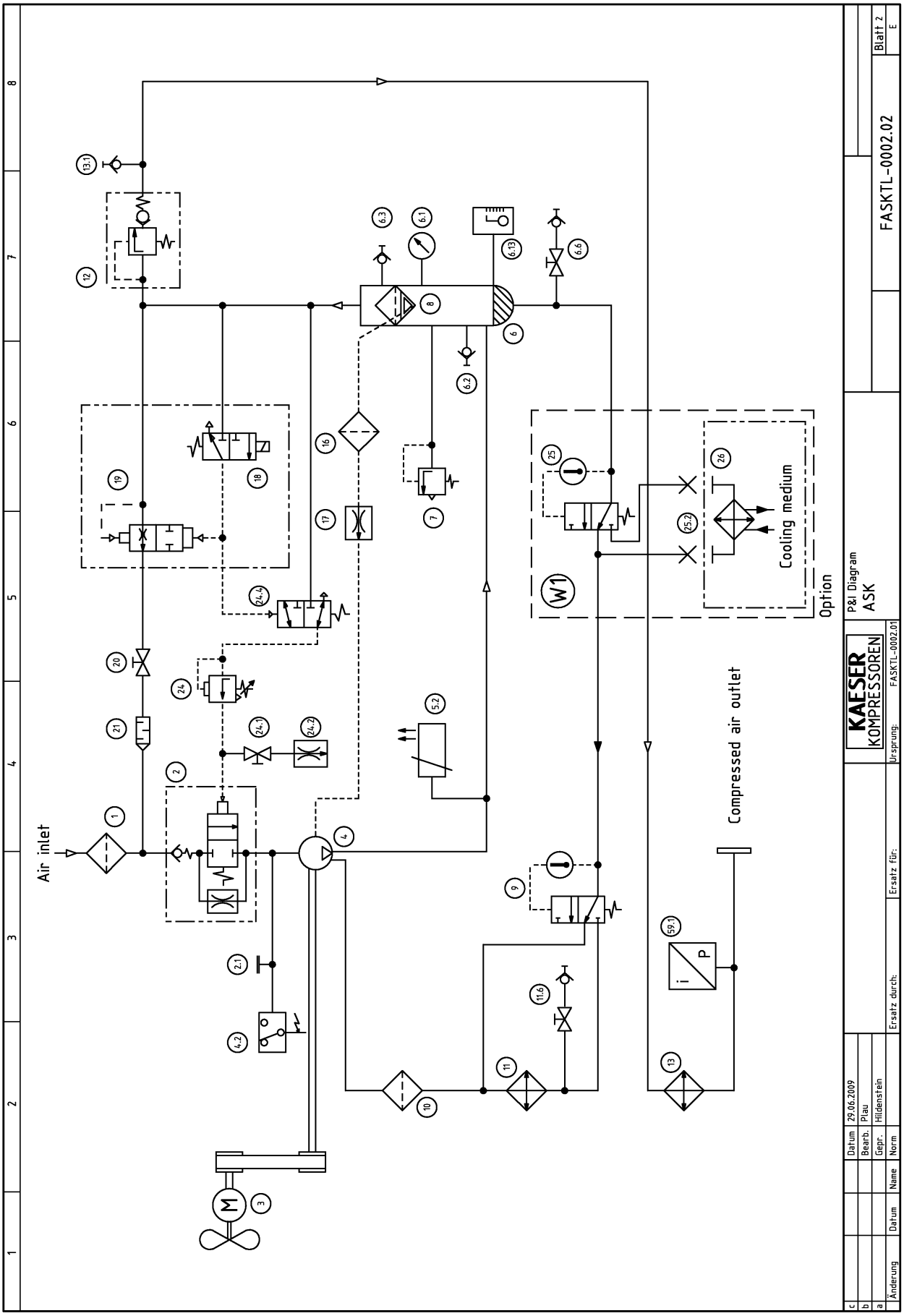
P&I Diagram legend
Option
Refrigeration dryer

FASKST-0001.02

Blatt 5
E

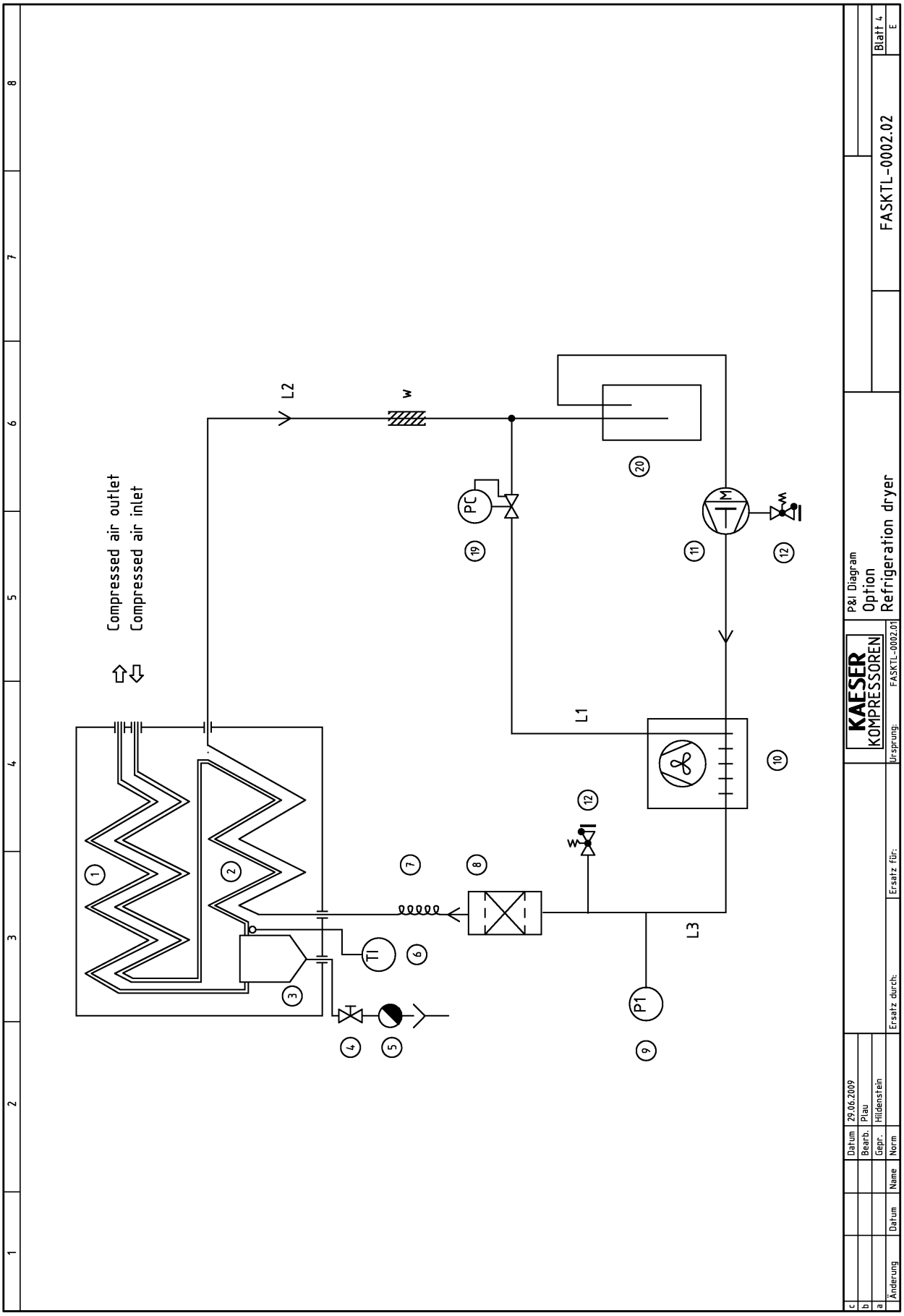
13.2 Option C1 Pipeline and instrument flow diagram (P&I diagram) MODULATING control


Compressed air outlet
Option
1 Compressor
3 Refrigeration dryer
P&I Diagram / P&I Diagram legend
Compressor Package
FASKTL-0002.02
Blatt 1
E
KAESER KOMPRESSOREN
Datum 29.06.2009
Bearb. Plau
Gepr. Hildenstein
Norm
Ersatz durch:
Ersatz für:
Ursprung: FASKTL-0002.01
Änderung Datum Name
Ä-Nr: 23646


Air inlet
Compressed air outlet
Cooling medium
Option
W1
P
i
P&I Diagram
ASK
FASKTL-0002.02
Blatt 2
KAESER KOMPRESSOREN
Ursprung:
Ersatz für:
Ersatz durch:
Datum
Name
Änderung
Norm
Gepr.
Bearb.
29.06.2009
Plau
Hildenstein

1	Air filter
2	Inlet valve
2.1	Oil filler with screw plug
3	Drive motor
4	Airend
4.2	Pressure switch - Wrong direction of rotation
5.2	PT100-sensor
6	Oil separator tank
6.1	Pressure gauge
6.2	Hose coupling (oil end)
6.3	Hose coupling (air end)
6.6	Shut-off valve with hose coupling - Oil drain
6.13	Oil level indicator
7	Pressure relief valve
8	Oil separator cartridge
9	Oil temperature controller
10	Oil filter
11	Oil cooler
11.6	Shut-off valve with hose coupling - Oil drain
12	Minimum pressure check valve
13	Air cooler
13.1	Hose coupling
16	Dirt trap
17	Nozzle
18/19	Combined control/venting valve
	18 Control valve
	19 Venting valve
20	Shut-off valve - Venting line
21	Silencer
24	Proportional controller
24.1	Shut-off valve open: machine in modulating control
	Shut-off valve closed: package running in DUAL-/QUADRO or VARIO mode
24.2	Nozzle
24.4	3/2-Directional control valve
25	Oil temperature thermostat for heat recovery system
25.2	Screw plug
26	Heat recovery system
59.1	Pressure transducer - System pressure
Option	
W1	Heat recovery system, external

c				Datum	29.06.2009		KAESER KOMPRESSOREN	P&I Diagram legend ASK	
b				Bearb.	Plau				
a				Gepr.	Hildenstein				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FASKTL-0002.01	FASKTL-0002.02	Blatt 3 E


Compressed air outlet
Compressed air inlet
L1
L2
L3
PC
TI
P1
M
P&I Diagram
Option
Refrigeration dryer
FASKTL-0002.02
Blatt 4
KAESER KOMPRESSOREN
Ursprung:
Ersatz für:
Ersatz durch:
Datum 29.06.2009
Bearb. Plau
Gepr. Hildenstein
Norm
Name
Datum
Änderung

1	2	3	4	5	6	7	8

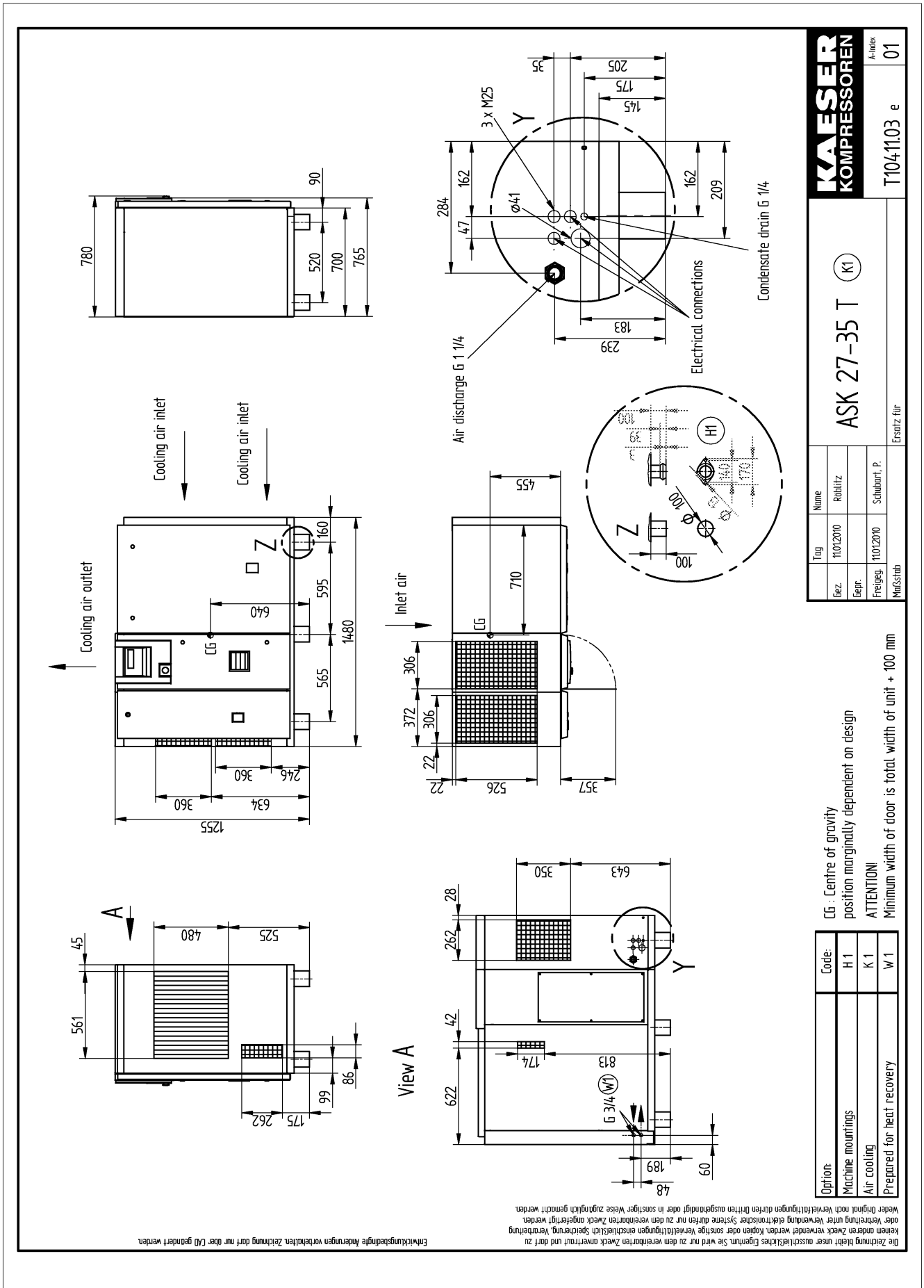
1	Air to air heat exchanger	heat insulated	12 Service connection (Schrader valve)
2	Air to refrigerant heat exchanger (Vapouriser)		19 Hot gas bypass valve
3	Condensate separator		20 Refrigerant separator
4	Shut-off valve		
5	Condensate drain		
6	Pressure dew point indicator TI		
7	Capillary tube (Refrigerant injection)		
8	Filter dryer		
9	Safety pressure switch		
10	Refrigerant condenser (air cooled condenser)		
11	Refrigerant compressor (hermetic)		

Piping:

L1	Bypass line
L2	CU-Pipe
L3	CU-Pipe
w	heat insulated

c				Datum	29.06.2009		KAESER KOMPRESSOREN	P&I Diagram legend	
b				Bearb.	Plau			Option	
a				Gepr.	Hildenstein			Refrigeration dryer	
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FASKTL-0002.01	FASKTL-0002.02 Blatt 5 E

13.3 Dimensional drawing


KAESER KOMPRESSOREN
ASK 27-35 T (K1)
T10411.03 e
A-Index 01
Tag Name
Gez. 11012010 Roblitz
Gepr.
Freigeg. 11012010 Schubart, P.
Maßstab
Ersatz für
CG : Centre of gravity
position marginally dependent on design
ATTENTION!
Minimum width of door is total width of unit + 100 mm
Option: Code:
Machine mountings H 1
Air cooling K 1
Prepared for heat recovery W 1
Cooling air inlet
Cooling air inlet
Cooling air outlet
Inlet air
Air discharge G 1 1/4
Electrical connections
Condensate drain G 1/4
3 x M25
View A
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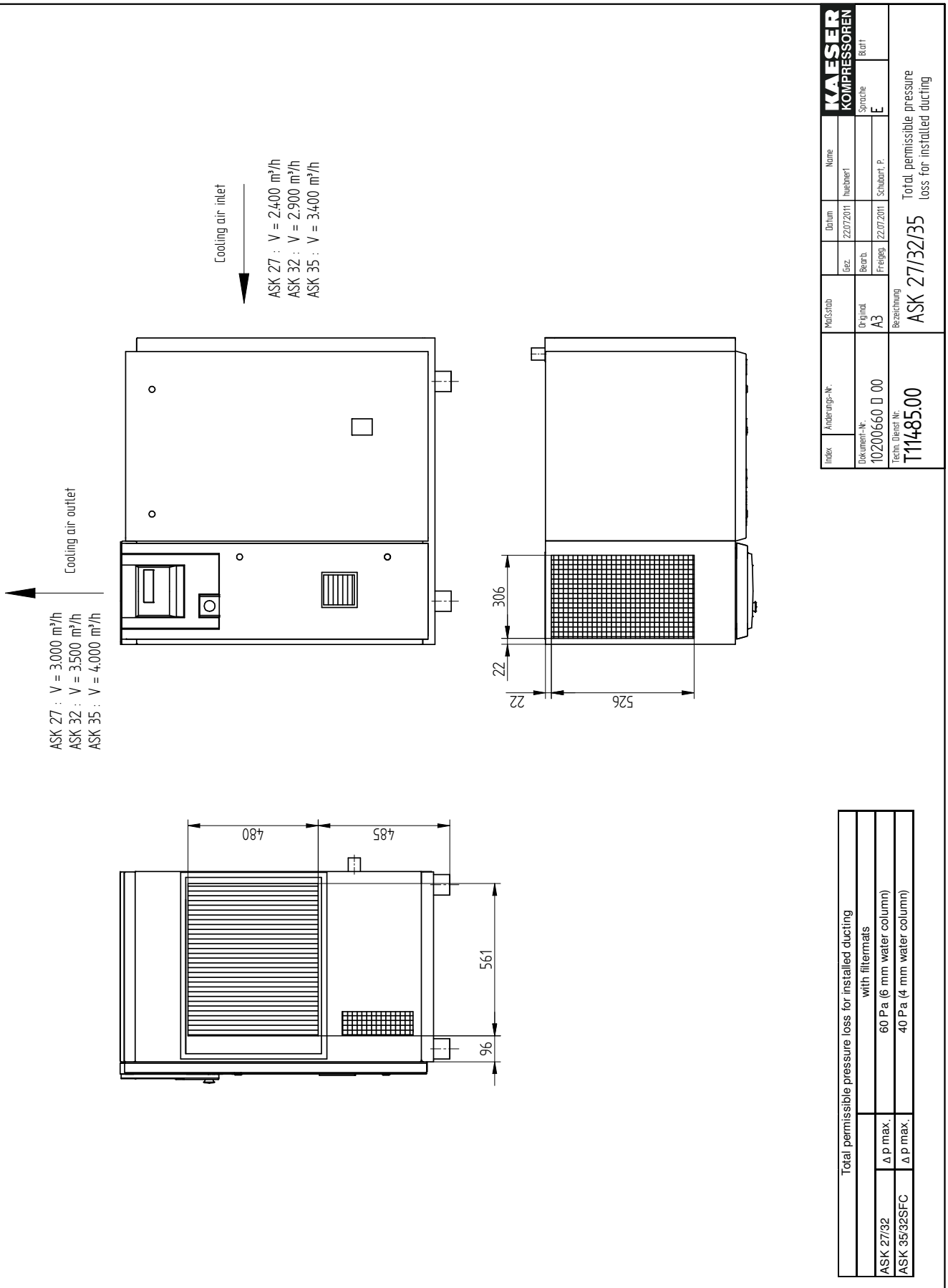
Entwicklungsbedingte Änderungen vorbehalten. Zeichnung darf nur über CAD gedruckt werden.



Index	Änderungs-Nr.	Maßstab		Datum	Name	KAESER KOMPRESSOREN	
			Gez.	22.07.2011	huebner1	Sprache	Blatt
Dokument-Nr. 10200660 D 00		Original A3	Bearb.			E	
			Freigeg.	22.07.2011	Schubart, P.		
Techn. Dienst Nr. T11485.00		Bezeichnung ASK 27/32/35 Total permissible pressure loss for installed ducting					

Total permissible pressure loss for installed ducting with filtermats		
ASK 27/32	Δ p max.	60 Pa (6 mm water column)
ASK 35/32SFC	Δ p max.	40 Pa (4 mm water column)

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13.4 Electrical Diagram

Electrical diagrams

Compressor series ASK

with SIGMA CONTROL BASIC

200V±10% 50/60Hz	230V±10% 50/60Hz
380V±10% 60Hz	400V±10% 50Hz
440V±10% 60Hz	460V±10% 60Hz

TT/TN power supply with common point grounding

ATTENTION !!!
The document gives collective information on
power supply voltages and frequencies for all machines.
The voltage and frequency and local conditions under
which any particular machine may be used
are given on the nameplate of the machine
and in the accompanying service manual.

Manufacturer: KAESER KOMPRESSOREN GmbH
96450 Coburg
GERMANY

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c				Datum	05.10.2011 E		KAESER KOMPRESSOREN	Cover page		=
b				Bearbeiter	Sitter			Compressor series ASK		+
a				Geprüft	Büchner					
A	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	DASK.B-03010.00	page 1 / 1 Bl.

Lfd. Nr. No.	Benennung Name		Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	Cover page			DASK.B-03010.00	1	
2	List of contents			ZASK.B-03010.00	1	
3	general instructions			UASK.B-03010.00	1	
4	electrical equipment identification			UASK.B-03010.00	2	
5	Equipment parts list			UASK.B-03010.00	3	
6	Equipment parts list			UASK.B-03010.00	4	
7	Equipment parts list			UASK.B-03010.00	5	
8	Circuit diagram	Power switching		SASK.B-03010.00	1	
9	Circuit diagram	Power switching Dryer		SASK.B-03010.00	2	
10	Circuit diagram	Control voltage tapping		SASK.B-03010.00	3	
11	Circuit diagram	supply/Relay-outputs		SASK.B-03010.00	4	
12	Circuit diagram	inputs internal		SASK.B-03010.00	5	
13	Circuit diagram	inputs/outputs external		SASK.B-03010.00	6	
14	Circuit diagram	control voltage supply		SASK.B-03010.00	7	
15	Circuit diagram	transformer diagrams		SASK.B-03010.00	8	
16	Terminal schedule	Terminal strip -X0,-X11		KASK.B-03010.00	1	
17	Terminal schedule	option T3/-X31,-1X31,-2X31		KASK.B-03010.00	2	
18	Component layout	Mounting plate		AASK.B-03010.00	1	

c				Datum	05.10.2011		KAESER KOMPRESSOREN	List of contents Compressor series ASK	=
b				Bearbeiter	Sitter				+
a				Geprüft	Büchner				
B	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	ZASK.B-03010.00	page 1 1 Bl.

general instructions

ATTENTION !!!
Install supplies, grounding and shock protection
to local safety regulations.
Control circuits are single-end-earthed, if they are floating
they may only be used together with insulation monitoring.
Do not make or break
live plug-in connectors.

control cabinet wiring for non-designated conductors
with multi-standard stranded conductors

primary circuits:	black
Control voltage AC 230V:	red 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
Control voltage AC 15V:	brown 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
Control voltage DC:	blue 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
external voltage:	orange 1,5mm² H07V-K, 16AWG UL-Style 1015, CSA-TEW
measuring circuits:	violet 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
earth conductor:	green/yellow

option T2 = transformer power supply for refrigeration dryer

option T3 = option refrigeration dryer

c				Datum	05.10.2011		KAESER KOMPRESSOREN	general instructions	=
b				Bearbeiter	Sitter			Compressor series ASK	+
a				Geprüft	Büchner				
C	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	UASK.B-03010.00	page 1 / 5 Bl.

electrical equipment identification

general components

-B25	Overload relay Compressor motor
-F11	Overload protection switch, Control transformer
-F12	Cut-out, Control transformer
-K20	SIGMA CONTROL BASIC
-M1	Compressor motor
-Q1	Mains contactor
-Q2	Delta contactor
-Q3	Star contactor
-S1	EMERGENCY STOP pushbutton
-S5	Door safety interlock switch
-T11	Control transformer

terminal strips/plug-in connections

-X0	Terminal strip, Power supply
-X11	Terminal strip, Control
-X31	Terminal strip refrigeration dryer, option T3
-1X31,-2X31	Connector plug refrigeration dryer, option T3

option T3 - refrigeration dryer

-F30	Overload protection switch, Dryer
-K13	Condensate drain, option F1
-K34	Condensate drain
-M30	Compressor motor
-M31	Fan motor
-Q30	Motor contactor
-T30	Transformer

sensors/actuators

-B1	Pressure transducer, Air main pressure
-B2	Direction of rotation pressure switch
-B30	Safety pressure switch, option T3
-B40	Temperature probe, Airend discharge temperature
-K1	Control valve

c				Datum	05.10.2011		KAESER KOMPRESSOREN	electrical equipment identification	=
b				Bearbeiter	Sitter			Compressor series ASK	+
a				Geprüft	Büchner				
C	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	UASK.B-03010.00	page 2 / 5 Bl.

Equipment parts list
ASK 27 / ASK 27 T

model

machine power supply		200 V ±10 %, 50 Hz 200 V ±10 %, 60 Hz	230 V ±10 %, 50 Hz 230 V ±10 %, 60 Hz	380 V ±10 %, 60 Hz	400 V ±10 %, 50 Hz	440 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz
Motor	-M1	15 kW diagram 2, Sht. 1	15 kW diagram 1, Sht. 1 (50 Hz) diagram 2, Sht. 1 (60 Hz)	15 kW diagram 1, Sht. 1	15 kW diagram 1, Sht. 1	15 kW diagram 1, Sht. 1
supply terminals	-X0	7.3140.02090	7.3140.02090	7.3140.02090	7.3140.02080	7.3140.02080
	Siemens	3RV1935-5A	3RV1935-5A	3RV1935-5A	3RV1915-5A	3RV1915-5A
terminal strips	-X11	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland
option T3	-X11/-X31	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland
Contactor	-Q1	7.6869.0	7.6869.0	7.6867.0	7.6866.0	7.6866.0
		3RT1036-1AL20	3RT1036-1AL20	3RT1034-1AL20	3RT1026-1AL20	3RT1026-1AL20
Auxiliary switch		7.3140.04050	7.3140.04050	7.3140.04050	7.3140.04050	7.3140.04050
		3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3
Interference suppressor		7.3140.00920	7.3140.00920	7.3140.00920	7.3140.01400	7.3140.01400
	Siemens	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1926-1CD00	3RT1926-1CD00
Contactor	-Q2	7.6869.0	7.6869.0	7.6867.0	7.6866.0	7.6866.0
		3RT1036-1AL20	3RT1036-1AL20	3RT1034-1AL20	3RT1026-1AL20	3RT1026-1AL20
Auxiliary switch		7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030
		3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01
Interference suppressor		7.3140.00920	7.3140.00920	7.3140.00920	7.3140.01400	7.3140.01400
	Siemens	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1926-1CD00	3RT1926-1CD00
Contactor	-Q3	7.6867.0	7.6866.0	7.6865.0	7.6865.0	7.6865.0
		3RT1034-1AL20	3RT1026-1AL20	3RT1025-1AL20	3RT1025-1AL20	3RT1025-1AL20
Auxiliary switch		7.3140.01690	7.3140.01690	7.3140.01690	7.3140.01690	7.3140.01690
		3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10
Auxiliary switch		7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030
		3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01
Interference suppressor		7.3140.00920	7.3140.01400	7.3140.01400	7.3140.01400	7.3140.01400
	Siemens	3RT1936-1CD00	3RT1926-1CD00	3RT1926-1CD00	3RT1926-1CD00	3RT1926-1CD00
Contactor	-Q30	7.6874.0	7.6874.0	7.6874.0	7.6874.0	7.6874.0
option T3		3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01
Interference suppressor		7.3140.01760	7.3140.01760	7.3140.01760	7.3140.01760	7.3140.01760
	Siemens	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00
Overload relay	-B25	7.6873.00200	7.6873.00200	7.6873.00200	7.6873.00190	7.6873.00190
		3RB2036-1UB0	3RB2036-1UB0	3RB2036-1UB0	3RB2026-1QB0	3RB2026-1QB0
		12,5-50 A	12,5-50 A	12,5-50 A	6-25 A	6-25 A
		setting: 40 A (50 Hz)	setting: 35 A (50 Hz) setting: 37 A (60 Hz)	setting: 23 A	setting: 20 A	setting: 19 A
	Siemens					
Overload protection switch	-F11	7.6860.00100	7.6860.00100	7.6860.00070	7.6860.00070	7.6860.00070
		3RV1011-0KA10	3RV1011-0KA10	3RV1011-0GA10	3RV1011-0GA10	3RV1011-0GA10
		0,9-1,25 A	0,9-1,25 A	0,45-0,63 A	0,45-0,63 A	0,45-0,63 A
	Siemens	setting: 1 A	setting: 1 A	setting: 0,55 A	setting: 0,55 A	setting: 0,55 A
Overload protection switch	-F30	7.6860.00190	7.6860.00180	7.6860.00180	7.6860.00180	7.6860.00180
option T3		3RV1011-1JA10	3RV1011-1HA10	3RV1011-1HA10	3RV1011-1HA10	3RV1011-1HA10
		7-10 A	5,5-8 A	5,5-8 A	5,5-8 A	5,5-8 A
	Siemens	setting: 8,8 A	setting: 7 A	setting: 7 A	setting: 7 A	setting: 7 A
Cut-out	-F12	7.6862.0	7.6862.0	---	---	---
	Siemens	5SY4105-7 0,5 A	5SY4105-7 0,5 A			
Transformer	-T11	7.6852.00010	7.6852.00010	7.6843.00010	7.6843.00010	7.6852.00010
		B0609057	B0609057	B0609052	B0609052	B0609057
		160 VA	160 VA	160 VA	160 VA	160 VA
		diagram 1, Sht. 7	diagram 2, Sht. 7	diagram 3, Sht. 7	diagram 4, Sht. 7	diagram 6+7, Sht. 7
Fuse		7.6849.0	7.6849.0	7.6849.0	7.6849.0	7.6849.0
	Block	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V
Transformer	-T30	7.3717.00260	---	7.2292.10060	7.3717.00240	7.2292.10060
option T3		B0406058		USTE1600	B0312005	USTE1600
		8,0 A		7,0 A	6,4 A	7,0 A
	Block	diagram 3, Sht. 8		diagram 2, Sht. 8	diagram 1, Sht. 8	diagram 2, Sht. 8
connection	-W13	7.3140.02120	7.3140.02120	7.3140.02120	7.3140.02110	7.3140.02110
	Siemens	3RV1935-1A	3RV1935-1A	3RV1935-1A	3RT1926-4CC20	3RT1926-4CC20
connection	-W14	7.3140.02120	1x6 mm² black	1x6 mm² black	7.3140.02130	7.3140.02130
	Siemens	3RV1935-1A	500 V, 70°C	500 V, 70°C	3RA1923-3D	3RA1923-3D
cables	-W19.1/.2	1x16 mm²	1x16 mm²	1x6 mm²	1x6 mm²	1x6 mm²
		500 V, 90°C	500 V, 90°C	500 V, 90°C	500 V, 90°C	500 V, 90°C
Compressor control	-K20	7.7005.4	7.7005.4	7.7005.4	7.7005.4	7.7005.4
	Siemens	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC
EMERGENCY STOP pushbutton	-S1	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
Switching element	Schlegel	7.3218.0 / MTH00	7.3218.0 / MTH00	7.3218.0 / MTH00	7.3218.0 / MTH00	7.3218.0 / MTH00
Control cabinet	KAESER	212905.0	212905.0	212905.0	212905.0	212905.0
Mounting plate	KAESER	209602.0	209602.0	209602.0	209602.0	209602.0

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UASK.B-03010.00
Equipment parts list
Compressor series ASK
KAESER KOMPRESSOREN
Ursprung:
Ersatz für:
Ersatz durch:

	Datum	Name
c	05.10.2011	
b	Sifter	
a	Büchner	
Änderung	Geprüft	Norm
	Bearbeiter	
	Datum	Name

Equipment parts list
ASK 32 / ASK 32 T

model

machine power supply	200 V ±10 %, 50 Hz 200 V ±10 %, 60 Hz	230 V ±10 %, 50 Hz 230 V ±10 %, 60 Hz	380 V ±10 %, 60 Hz	400 V ±10 %, 50 Hz	440 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz
Motor -M1	18,5 kW diagram 2, Sht. 1	18,5 kW diagram 1, Sht. 1 (50 Hz) diagram 2, Sht. 1 (60 Hz)	18,5 kW diagram 1, Sht. 1	18,5 kW diagram 1, Sht. 1	18,5 kW diagram 1, Sht. 1
supply terminals -X0	3x 7.3140.02100	7.3140.02090	7.3140.02090	7.3140.02090	7.3140.02090
Siemens	3RA1943-3L	3RV1935-5A	3RV1935-5A	3RV1935-5A	3RV1935-5A
terminal strips -X11	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland
option T3 -X11/-X31	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland
Contactor -Q1	7.6870.0	7.6869.0	7.6867.0	7.6867.0	7.6867.0
	3RT1044-1AL20	3RT1036-1AL20	3RT1034-1AL20	3RT1034-1AL20	3RT1034-1AL20
Auxiliary switch	7.3140.02230	7.3140.04050	7.3140.04050	7.3140.04050	7.3140.04050
	3RH1921-1XA20-0PA0	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3
Auxiliary switch	7.3140.02200	---	---	---	---
	3RH1921-1DA11				
Interference suppressor	7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920
Siemens	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00
Contactor -Q2	7.6870.0	7.6869.0	7.6867.0	7.6867.0	7.6867.0
	3RT1044-1AL20	3RT1036-1AL20	3RT1034-1AL20	3RT1034-1AL20	3RT1034-1AL20
Auxiliary switch	7.3140.02200	7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030
	3RH1921-1DA11	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01
Interference suppressor	7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920
Siemens	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00
Contactor -Q3	7.6867.0	7.6867.0	7.6865.0	7.6865.0	7.6865.0
	3RT1034-1AL20	3RT1034-1AL20	3RT1025-1AL20	3RT1025-1AL20	3RT1025-1AL20
Auxiliary switch	7.3140.01690	7.3140.01690	7.3140.01690	7.3140.01690	7.3140.01690
	3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10
Auxiliary switch	7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030
	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01
Interference suppressor	7.3140.00920	7.3140.00920	7.3140.01400	7.3140.01400	7.3140.01400
Siemens	3RT1936-1CD00	3RT1936-1CD00	3RT1926-1CD00	3RT1926-1CD00	3RT1926-1CD00
Contactor -Q30	7.6874.0	7.6874.0	7.6874.0	7.6874.0	7.6874.0
option T3	3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01
Interference suppressor	7.3140.01760	7.3140.01760	7.3140.01760	7.3140.01760	7.3140.01760
Siemens	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00
Overload relay -B25	7.6873.00220	7.6873.00200	7.6873.00200	7.6873.00200	7.6873.00200
	3RB2046-1EB0	3RB2036-1UB0	3RB2036-1UB0	3RB2036-1UB0	3RB2036-1UB0
	25-100 A	12,5-50 A	12,5-50 A	12,5-50 A	12,5-50 A
	setting: 49 A (50 Hz)	setting: 42 A (50 Hz) setting: 44 A (60 Hz)	setting: 27 A	setting: 24 A	setting: 22 A
Siemens					
Overload protection switch -F11	7.6860.00100	7.6860.00100	7.6860.00070	7.6860.00070	7.6860.00070
	3RV1011-0KA10	3RV1011-0KA10	3RV1011-0GA10	3RV1011-0GA10	3RV1011-0GA10
	0,9-1,25 A	0,9-1,25 A	0,45-0,63 A	0,45-0,63 A	0,45-0,63 A
Siemens	setting: 1 A	setting: 1 A	setting: 0,55 A	setting: 0,55 A	setting: 0,55 A
Overload protection switch -F30	7.6860.00190	7.6860.00180	7.6860.00180	7.6860.00180	7.6860.00180
option T3	3RV1011-1JA10	3RV1011-1HA10	3RV1011-1HA10	3RV1011-1HA10	3RV1011-1HA10
	7-10 A	5,5-8 A	5,5-8 A	5,5-8 A	5,5-8 A
Siemens	setting: 8,8 A	setting: 7 A	setting: 7 A	setting: 7 A	setting: 7 A
Cut-out -F12	7.6862.0	7.6862.0	---	---	---
Siemens	5SY4105-7 0,5 A	5SY4105-7 0,5 A			
Transformer -T11	7.6852.00010	7.6852.00010	7.6843.00010	7.6843.00010	7.6852.00010
	B0609057	B0609057	B0609052	B0609052	B0609057
	160 VA	160 VA	160 VA	160 VA	160 VA
	diagram 1, Sht. 7	diagram 2, Sht. 7	diagram 3, Sht. 7	diagram 4, Sht. 7	diagram 6+7, Sht. 7
Fuse	7.6849.0	7.6849.0	7.6849.0	7.6849.0	7.6849.0
Block	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V
Transformer -T30	7.3717.00260	---	7.2292.10060	7.3717.00240	7.2292.10060
option T3	B0406058		USTE1600	B0312005	USTE1600
	8,0 A		7,0 A	6,4 A	7,0 A
Block	diagram 3, Sht. 8		diagram 2, Sht. 8	diagram 1, Sht. 8	diagram 2, Sht. 8
connection -W13	7.3140.03180	7.3140.02120	7.3140.02120	7.3140.02120	7.3140.02120
Siemens	3RA1943-3D	3RV1935-1A	3RV1935-1A	3RV1935-1A	3RV1935-1A
connection -W14	1x16 mm² black	7.3140.02120	1x6 mm² black	1x6 mm² black	1x6 mm² black
Siemens	500 V, 70°C	3RV1935-1A	500 V, 70°C	500 V, 70°C	500 V, 70°C
cables -W19.1/.2	1x16 mm²	1x16 mm²	1x10 mm²	1x6 mm²	1x6 mm²
	500 V, 90°C	500 V, 90°C	500 V, 90°C	500 V, 90°C	500 V, 90°C
Compressor control -K20	7.7005.4	7.7005.4	7.7005.4	7.7005.4	7.7005.4
Siemens	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC
EMERGENCY STOP pushbutton -S1	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
Switching element Schlegel	7.3218.0 / MTHOO	7.3218.0 / MTHOO	7.3218.0 / MTHOO	7.3218.0 / MTHOO	7.3218.0 / MTHOO
Control cabinet KAESER	212905.0	212905.0	212905.0	212905.0	212905.0
Mounting plate KAESER	209602.0	209602.0	209602.0	209602.0	209602.0

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UASK.B-03010.00
Equipment parts list
Compressor series ASK
KAESER KOMPRESSOREN
Ursprung:
Ersatz für:
Ersatz durch:
Datum 05.10.2011
Bearbeiter Sitter
Geprüft Büchner
Norm
Name
Datum
c
b
a
C Änderung

Equipment parts list
ASK 35 / ASK 35 T

model

machine power supply		200 V ±10 %, 50 Hz 200 V ±10 %, 60 Hz	230 V ±10 %, 50 Hz 230 V ±10 %, 60 Hz	380 V ±10 %, 60 Hz	400 V ±10 %, 50 Hz	440 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz
Motor	-M1	22 kW diagram 2, Sht. 1	22 kW diagram 1, Sht. 1 (50 Hz) diagram 2, Sht. 1 (60 Hz)	22 kW diagram 1, Sht. 1	22 kW diagram 1, Sht. 1	22 kW diagram 1, Sht. 1
supply terminals	-X0	3x 7.3140.02100	3x 7.3140.02100	7.3140.02090	7.3140.02090	7.3140.02090
Siemens		3RA1943-3L	3RA1943-3L	3RV1935-5A	3RV1935-5A	3RV1935-5A
terminal strips	-X11	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland	7.6836.00060 Wieland
option T3	-X11/-X31	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland	7.6836.00070 Wieland
Contactor	-Q1	7.6870.0	7.6870.0	7.6868.0	7.6867.0	7.6867.0
		3RT1044-1AL20	3RT1044-1AL20	3RT1035-1AL20	3RT1034-1AL20	3RT1034-1AL20
Auxiliary switch		7.3140.02230	7.3140.02230	7.3140.04050	7.3140.04050	7.3140.04050
		3RH1921-1XA20-0PA0	3RH1921-1XA20-0PA0	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3	3RH1921-1XA31-0MA3
Auxiliary switch		7.3140.02200	7.3140.02200	---	---	---
		3RH1921-1DA11	3RH1921-1DA11			
Interference suppressor		7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920
Siemens		3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00
Contactor	-Q2	7.6870.0	7.6870.0	7.6868.0	7.6867.0	7.6867.0
		3RT1044-1AL20	3RT1044-1AL20	3RT1035-1AL20	3RT1034-1AL20	3RT1034-1AL20
Auxiliary switch		7.3140.02200	7.3140.02200	7.3140.02030	7.3140.02030	7.3140.02030
		3RH1921-1DA11	3RH1921-1DA11	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01
Interference suppressor		7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920	7.3140.00920
Siemens		3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00	3RT1936-1CD00
Contactor	-Q3	7.6867.0	7.6867.0	7.6866.0	7.6865.0	7.6865.0
		3RT1034-1AL20	3RT1034-1AL20	3RT1026-1AL20	3RT1025-1AL20	3RT1025-1AL20
Auxiliary switch		7.3140.01690	7.3140.01690	7.3140.01690	7.3140.01690	7.3140.01690
		3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10	3RH1921-1CA10
Auxiliary switch		7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030	7.3140.02030
		3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01	3RH1921-1CA01
Interference suppressor		7.3140.00920	7.3140.00920	7.3140.01400	7.3140.01400	7.3140.01400
Siemens		3RT1936-1CD00	3RT1936-1CD00	3RT1926-1CD00	3RT1926-1CD00	3RT1926-1CD00
Contactor	-Q30	7.6874.0	7.6874.0	7.6874.0	7.6874.0	7.6874.0
option T3		3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01	3RT1016-1AP01
Interference suppressor		7.3140.01760	7.3140.01760	7.3140.01760	7.3140.01760	7.3140.01760
Siemens		3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00	3RT1916-1CD00
Overload relay	-B25	7.6873.00220	7.6873.00220	7.6873.00200	7.6873.00200	7.6873.00200
		3RB2046-1EB0	3RB2046-1EB0	3RB2036-1UB0	3RB2036-1UB0	3RB2036-1UB0
		25-100 A	25-100 A	12,5-50 A	12,5-50 A	12,5-50 A
		setting: 54 A (50 Hz)	setting: 47 A (50 Hz)	setting: 30 A	setting: 27 A	setting: 25 A
Siemens			setting: 50 A (60 Hz)			
Overload protection switch	-F11	7.6860.00100	7.6860.00100	7.6860.00070	7.6860.00070	7.6860.00070
		3RV1011-0KA10	3RV1011-0KA10	3RV1011-0GA10	3RV1011-0GA10	3RV1011-0GA10
		0,9-1,25 A	0,9-1,25 A	0,45-0,63 A	0,45-0,63 A	0,45-0,63 A
Siemens		setting: 1 A	setting: 1 A	setting: 0,55 A	setting: 0,55 A	setting: 0,55 A
Overload protection switch	-F30	7.6860.00190	7.6860.00180	7.6860.00180	7.6860.00180	7.6860.00180
option T3		3RV1011-1JA10	3RV1011-1HA10	3RV1011-1HA10	3RV1011-1HA10	3RV1011-1HA10
		7-10 A	5,5-8 A	5,5-8 A	5,5-8 A	5,5-8 A
Siemens		setting: 8,8 A	setting: 7 A	setting: 7 A	setting: 7 A	setting: 7 A
Cut-out	-F12	7.6862.0	7.6862.0	---	---	---
Siemens		5SY4105-7 0,5 A	5SY4105-7 0,5 A			
Transformer	-T11	7.6852.00010	7.6852.00010	7.6843.00010	7.6843.00010	7.6852.00010
		B0609057	B0609057	B0609052	B0609052	B0609057
		160 VA	160 VA	160 VA	160 VA	160 VA
		diagram 1, Sht. 7	diagram 2, Sht. 7	diagram 3, Sht. 7	diagram 4, Sht. 7	diagram 6+7, Sht. 7
Fuse		7.6849.0	7.6849.0	7.6849.0	7.6849.0	7.6849.0
Block		T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V	T3,15H / 3,15 A, 250 V
Transformer	-T30	7.3717.00260	---	7.2292.10060	7.3717.00240	7.2292.10060
option T3		B0406058		USTE1600	B0312005	USTE1600
		8,0 A		7,0 A	6,4 A	7,0 A
Block		diagram 3, Sht. 8		diagram 2, Sht. 8	diagram 1, Sht. 8	diagram 2, Sht. 8
connection	-W13	7.3140.03180	7.3140.03180	7.3140.02120	7.3140.02120	7.3140.02120
Siemens		3RA1943-3D	3RA1943-3D	3RV1935-1A	3RV1935-1A	3RV1935-1A
connection	-W14	1x16 mm² black	1x16 mm² black	1x6 mm² black	1x6 mm² black	1x6 mm² black
Siemens		500 V, 70°C	500 V, 70°C	500 V, 70°C	500 V, 70°C	500 V, 70°C
cables	-W19.1/.2	1x16 mm²	1x16 mm²	1x10 mm²	1x6 mm²	1x6 mm²
		500 V, 90°C	500 V, 90°C	500 V, 90°C	500 V, 90°C	500 V, 90°C
Compressor control	-K20	7.7005.4	7.7005.4	7.7005.4	7.7005.4	7.7005.4
Siemens		SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC	SIGMA CONTROL BASIC
EMERGENCY STOP pushbutton	-S1	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
Switching element	Schlegel	7.3218.0 / MTH00	7.3218.0 / MTH00	7.3218.0 / MTH00	7.3218.0 / MTH00	7.3218.0 / MTH00
Control cabinet	KAESER	212905.0	212905.0	212905.0	212905.0	212905.0
Mounting plate	KAESER	209602.0	209602.0	209602.0	209602.0	209602.0

page 5 5 Bl.

UASK.B-03010.00

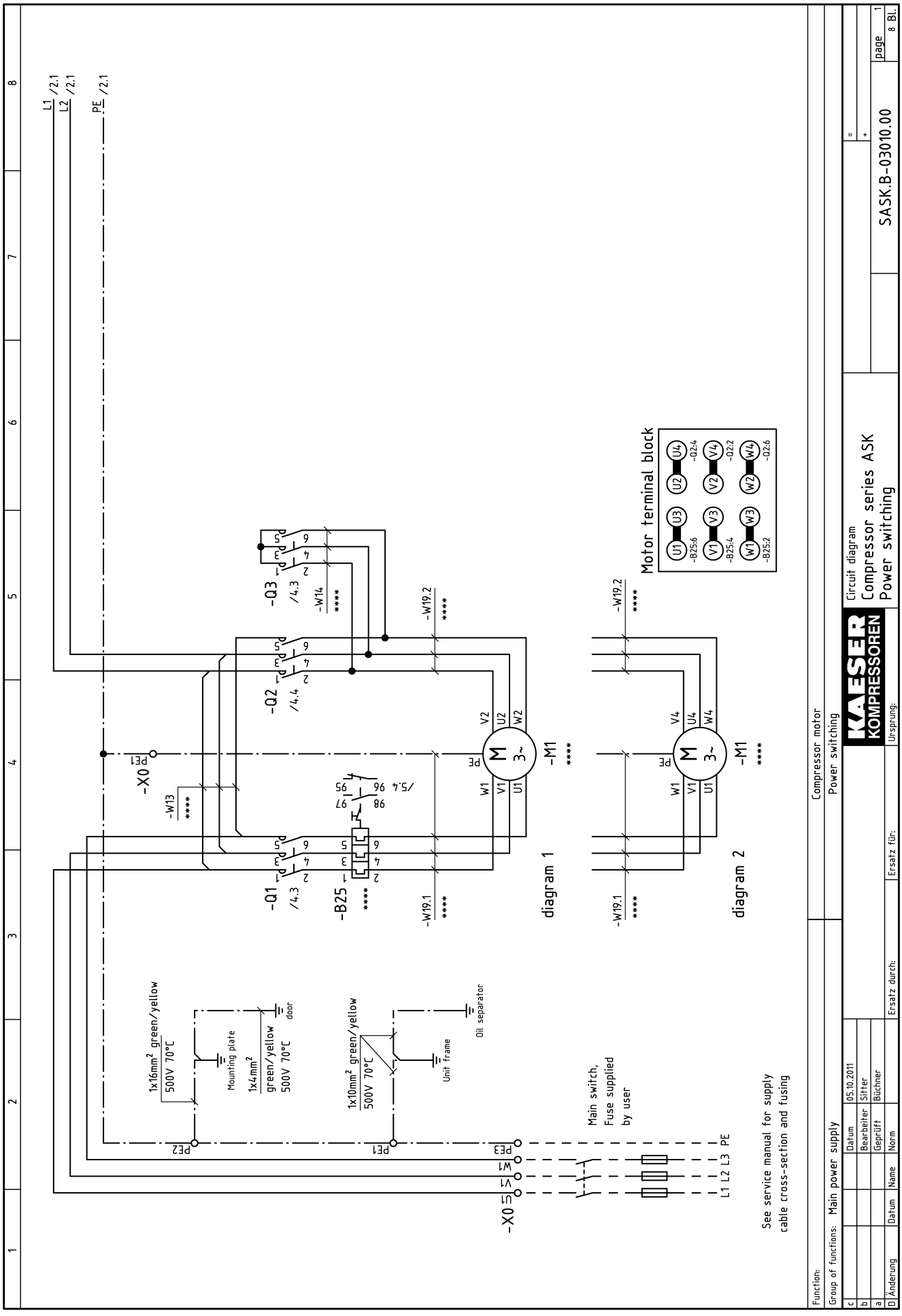
Equipment parts list
Compressor series ASK

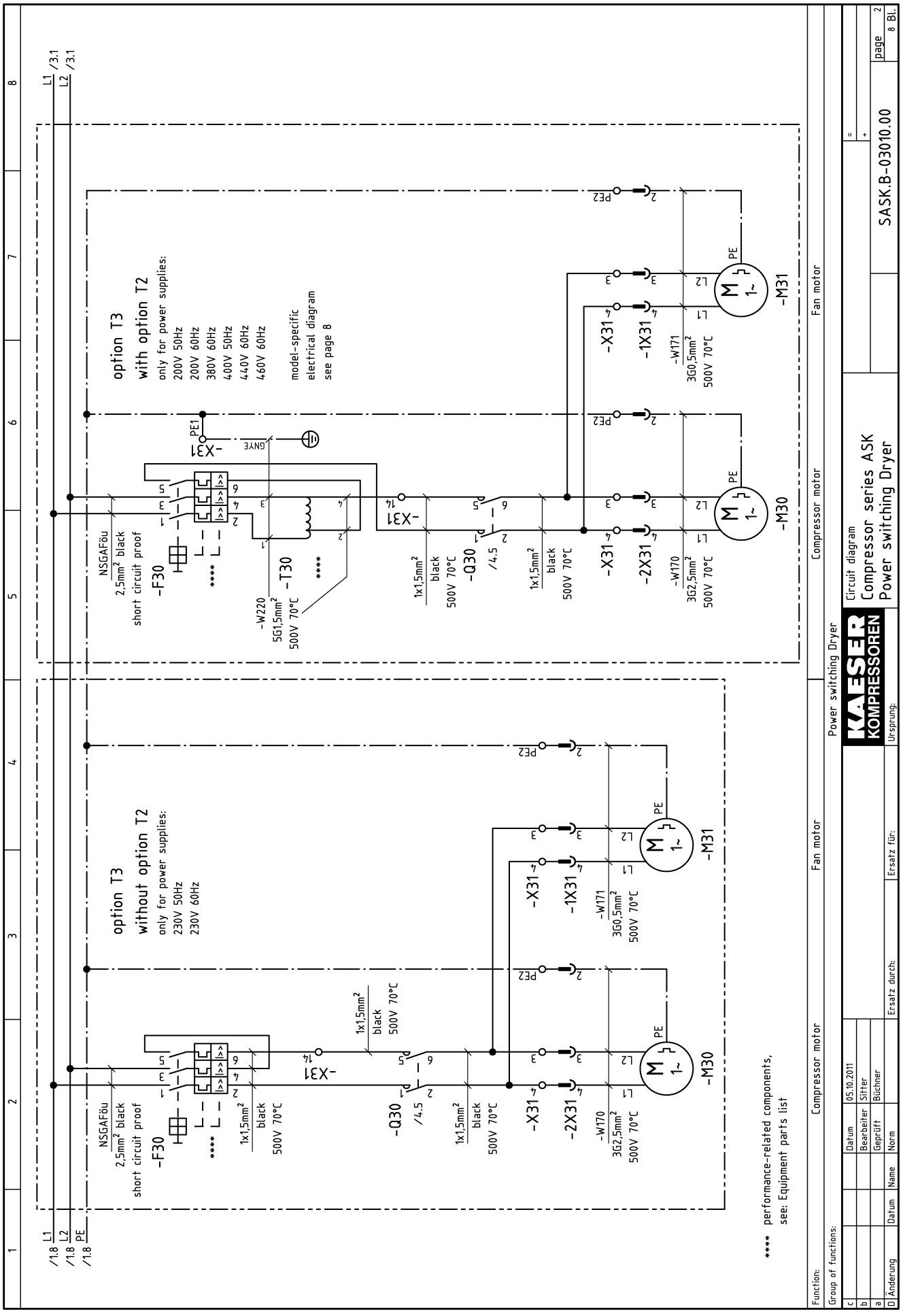
KAESER KOMPRESSOREN

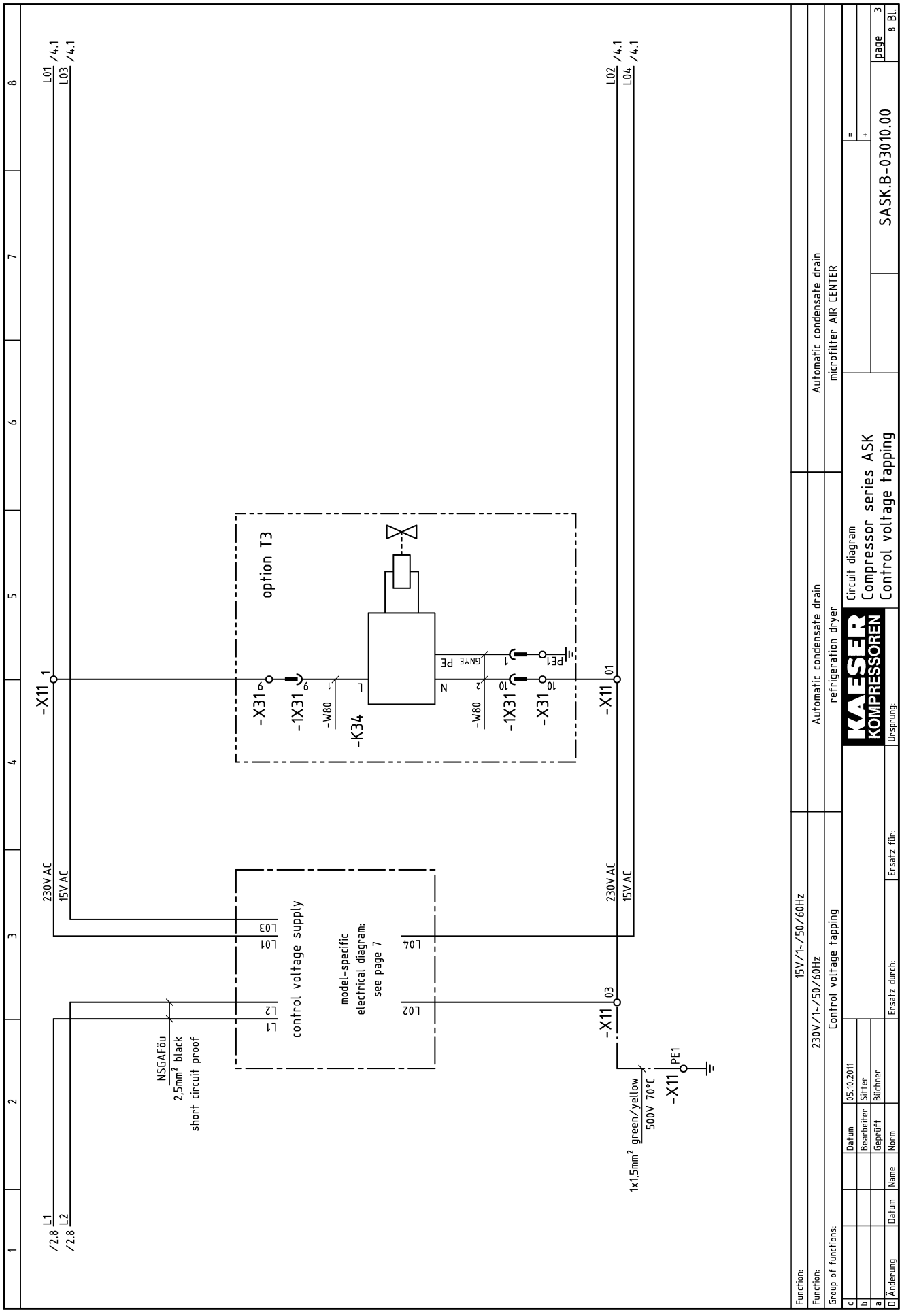
Ursprung:
Ersatz für:
Ersatz durch:

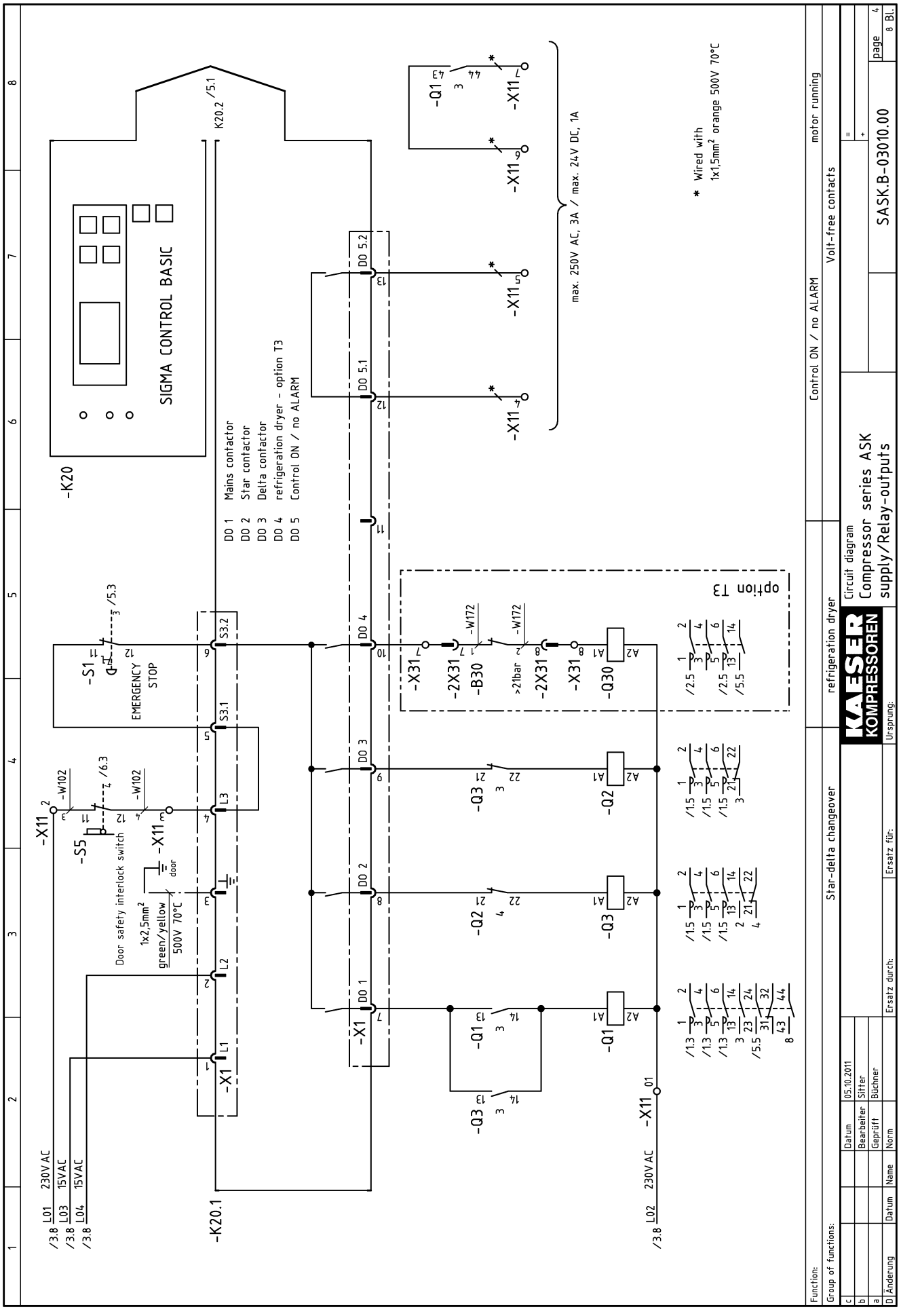
	Datum	Name
Bearbeiter	05.10.2011	Sitter
Geprüft		Büchner
Norm		
Datum		
Name		
Datum		

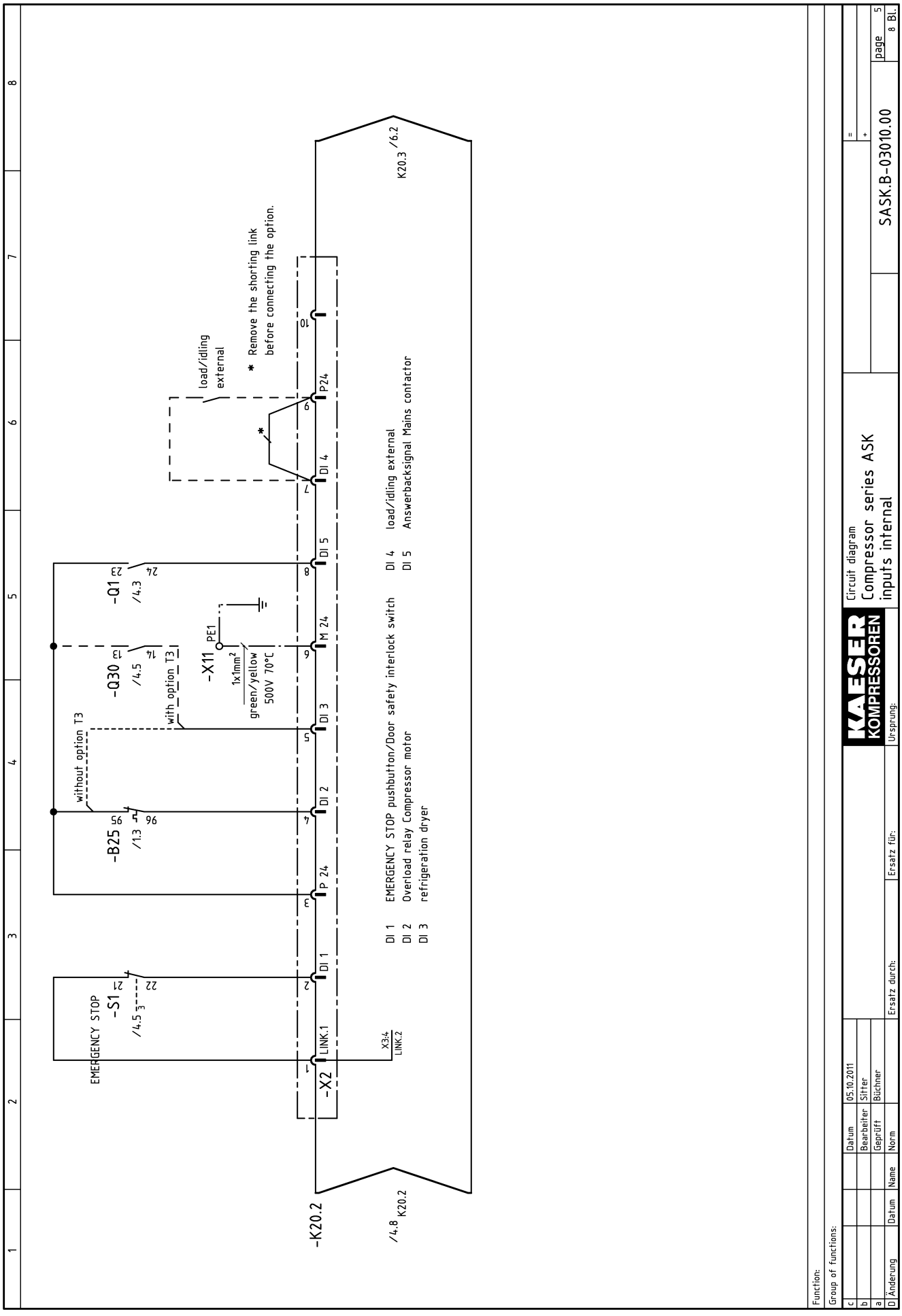
c
b
a
C Änderung

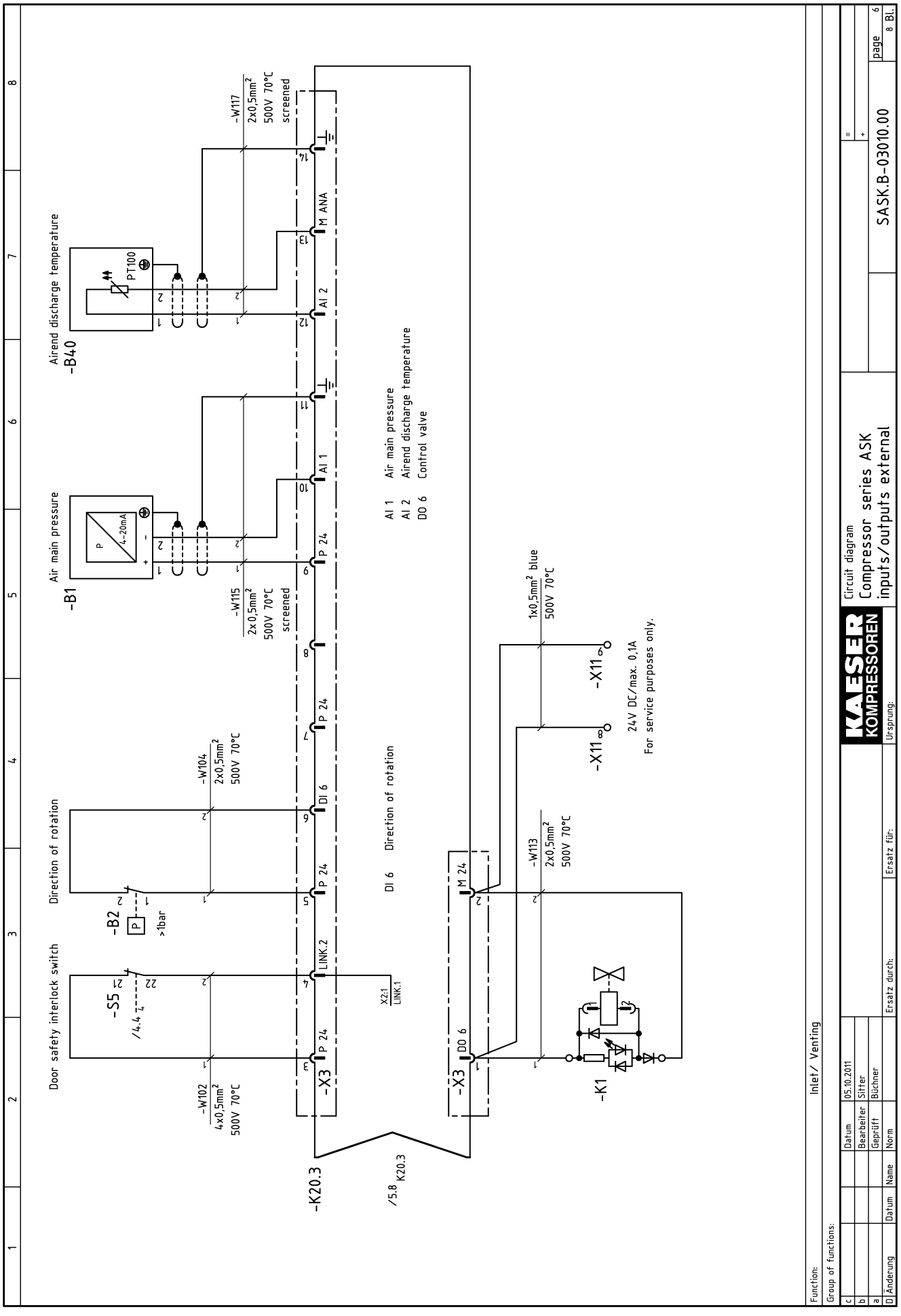

L1 /2.1
L2 /2.1
PE /2.1
-X0
-W13
-Q3 /4.3
-W14
-Q2 /4.4
-W19.2
-Q1 /4.3
-B25
-W19.1
-M1
diagram 1
diagram 2
Motor terminal block
-B25.6
-B25.4
-B25.2
-Q2.4
-Q2.2
-Q2.6
1x16mm² green/yellow
500V 70°C
Mounting plate
1x4mm²
green/yellow
500V 70°C
door
1x10mm² green/yellow
500V 70°C
Unit frame
Oil separator
Main switch,
Fuse supplied
by user
L1 L2 L3 PE
See service manual for supply
cable cross-section and fusing
Compressor motor
Power switching
Circuit diagram
Compressor series ASK
Power switching
SASK.B-03010.00
page 1
8 Bl.


option T3
with option T2
only for power supplies:
200V 50Hz
200V 60Hz
380V 60Hz
400V 50Hz
440V 60Hz
460V 60Hz
model-specific
electrical diagram
see page 8
option T3
without option T2
only for power supplies:
230V 50Hz
230V 60Hz
NSGAFöu
2,5mm² black
short circuit proof
-F30
-T30
-W220
5G1,5mm²
500V 70°C
-Q30
/4.5
1x1,5mm²
black
500V 70°C
-X31
-1X31
-2X31
-W171
3G0,5mm²
-W170
3G2,5mm²
-M30
-M31
Compressor motor
Fan motor
Power switching Dryer
**** performance-related components,
see: Equipment parts list
KAESER KOMPRESSOREN
Circuit diagram
Compressor series ASK
Power switching Dryer
SASK.B-03010.00
page 2
8 Bl.


option T3
-X31
-1X31
-W80
-K34
-X11
control voltage supply
model-specific
electrical diagram:
see page 7
NSGAFöu
2,5mm² black
short circuit proof
1x1,5mm² green/yellow
500V 70°C
-X11 PE1
230V AC
15V AC
L01 /4.1
L03 /4.1
L02 /4.1
L04 /4.1
/2.8 L1
/2.8 L2
15V/1~/50/60Hz
230V/1~/50/60Hz
Control voltage tapping
Automatic condensate drain
refrigeration dryer
Automatic condensate drain
microfilter AIR CENTER
Circuit diagram
Compressor series ASK
Control voltage tapping
SASK.B-03010.00
page 3
8 Bl.


SIGMA CONTROL BASIC
-K20
-K20.1
-K20.2 /5.1
DO 1 Mains contactor
DO 2 Star contactor
DO 3 Delta contactor
DO 4 refrigeration dryer - option T3
DO 5 Control ON / no ALARM
max. 250V AC, 3A / max. 24V DC, 1A
* Wired with 1x1,5mm² orange 500V 70°C
-S1 EMERGENCY STOP
-S5 Door safety interlock switch
1x2,5mm² green/yellow 500V 70°C
-W102
-X1
-X11
-Q1
-Q2
-Q3
-Q30
-X31
-2X31
-B30
-W172
>21bar
option T3
230V AC
15VAC
Control ON / no ALARM
motor running
Volt-free contacts
refrigeration dryer
Star-delta changeover
Circuit diagram
Compressor series ASK
supply/Relay-outputs
SASK.B-03010.00
page 4
8 Bl.
Function:
Group of functions:
Datum 05.10.2011
Bearbeiter Sitter
Geprüft Büchner
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Name
Datum


load/idling external
* Remove the shorting link before connecting the option.
K20.3 /6.2
-Q1 /4.3
-Q30 /4.5
-X11 PE1
1x1mm²
green/yellow
500V 70°C
with option T3
without option T3
-B25 /1.3
EMERGENCY STOP
-S1 /4.5
-X2
LINK.1
X3:4
LINK.2
DI 1 EMERGENCY STOP pushbutton/Door safety interlock switch
DI 2 Overload relay Compressor motor
DI 3 refrigeration dryer
DI 4 load/idling external
DI 5 Answerbacksignal Mains contactor
-K20.2
/4.8 K20.2
KAESER KOMPRESSOREN
Circuit diagram
Compressor series ASK
inputs internal
SASK.B-03010.00
page 5
8 Bl.
Function:
Group of functions:
Datum 05.10.2011
Bearbeiter Sitter
Geprüft Büchner
Name
Norm
Ersatz durch:
Ersatz für:
Ursprung:


Airend discharge temperature
-B40
PT100
-W117
2x0,5mm²
500V 70°C
screened
M ANA
AI 2
Air main pressure
-B1
4-20mA
-W115
2x 0,5mm²
500V 70°C
screened
AI 1
P 24
AI 1 Air main pressure
AI 2 Airend discharge temperature
DO 6 Control valve
Direction of rotation
-B2
>1bar
-W104
2x0,5mm²
500V 70°C
DI 6
DI 6 Direction of rotation
Door safety interlock switch
-S5
/4.4
LINK.2
X2:1
LINK.1
-W102
4x0,5mm²
500V 70°C
-X3
M 24
DO 6
-W113
2x0,5mm²
500V 70°C
1x0,5mm² blue
500V 70°C
-X11
24 V DC/max. 0,1A
For service purposes only.
-K1
-K20.3
/5.8 K20.3
Function:
Inlet/ Venting
Group of functions:
KAESER KOMPRESSOREN
Circuit diagram
Compressor series ASK
inputs/outputs external
SASK.B-03010.00
page 6
8 Bl.
Datum 05.10.2011
Bearbeiter Sitter
Geprüft Büchner
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung Datum Name

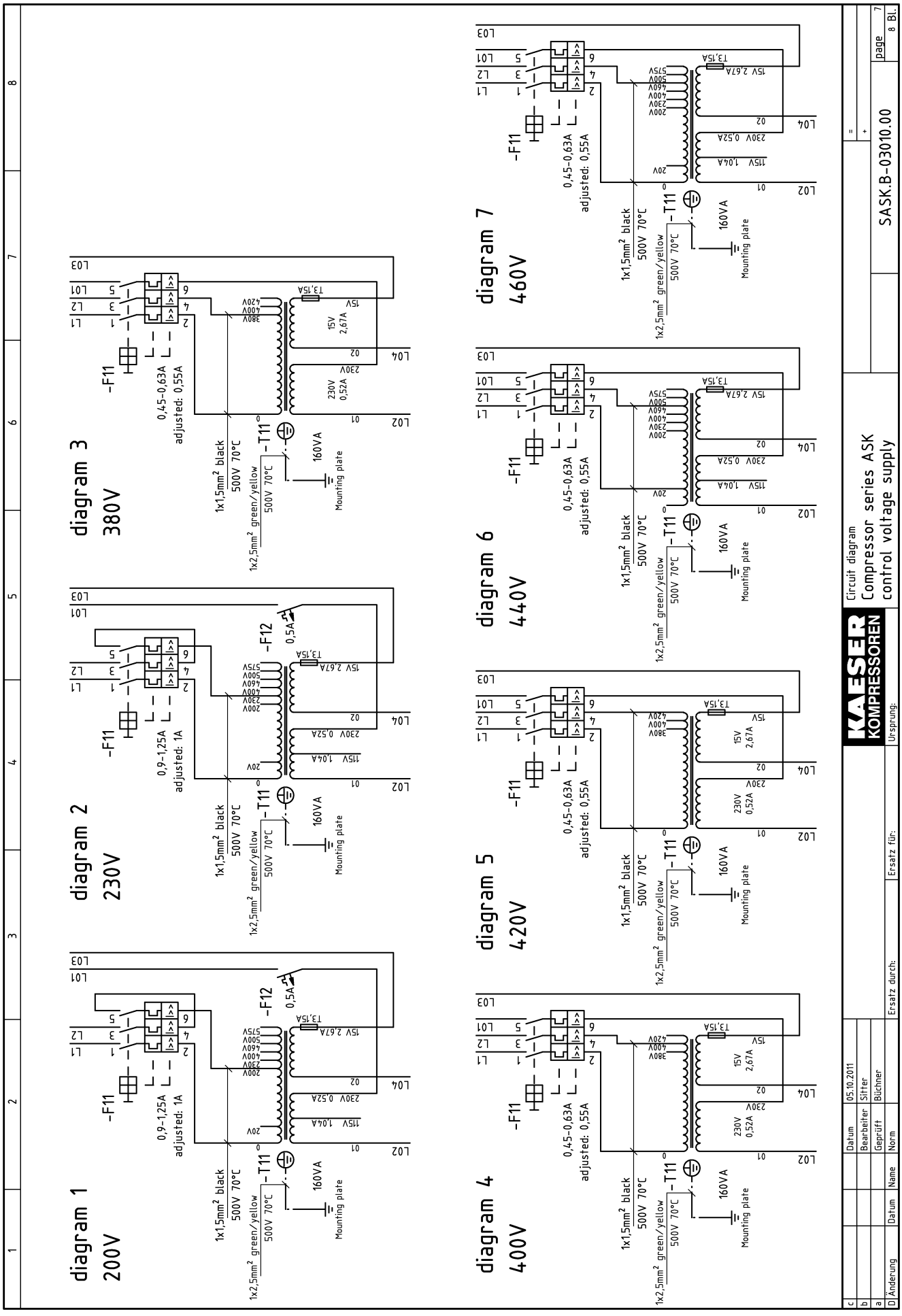


diagram 1
200V
diagram 2
230V
diagram 3
380V
diagram 4
400V
diagram 5
420V
diagram 6
440V
diagram 7
460V
-F11
-F12
-T11
0,45-0,63A
adjusted: 0,55A
0,9-1,25A
adjusted: 1A
0,5A
160VA
Mounting plate
1x1,5mm² black
500V 70°C
1x2,5mm² green/yellow
500V 70°C
Circuit diagram
Compressor series ASK
control voltage supply
SASK.B-03010.00
page 7
8 Bl.
Datum
Name
Bearbeiter
Sitter
Geprüft
Büchner
Norm
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

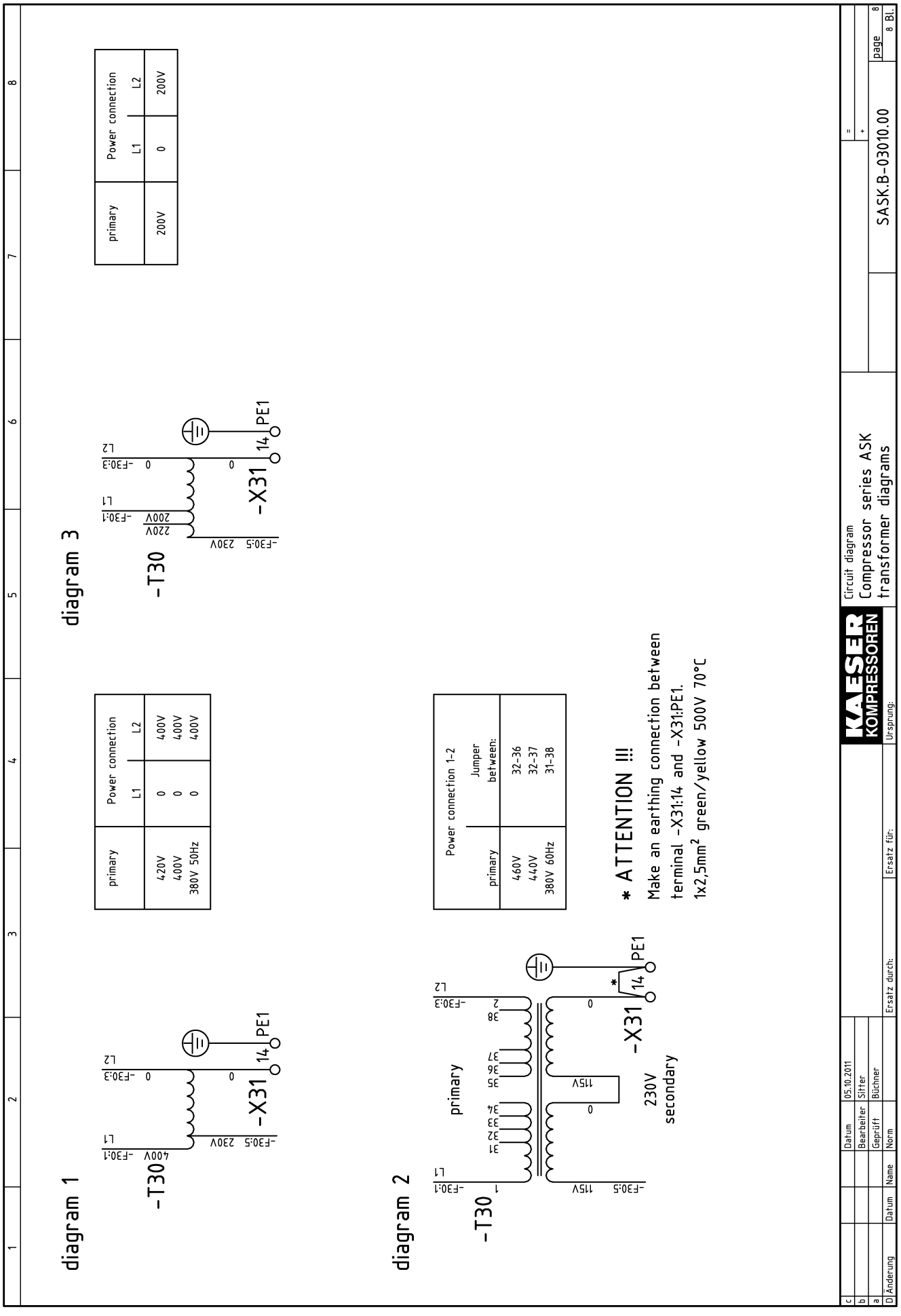
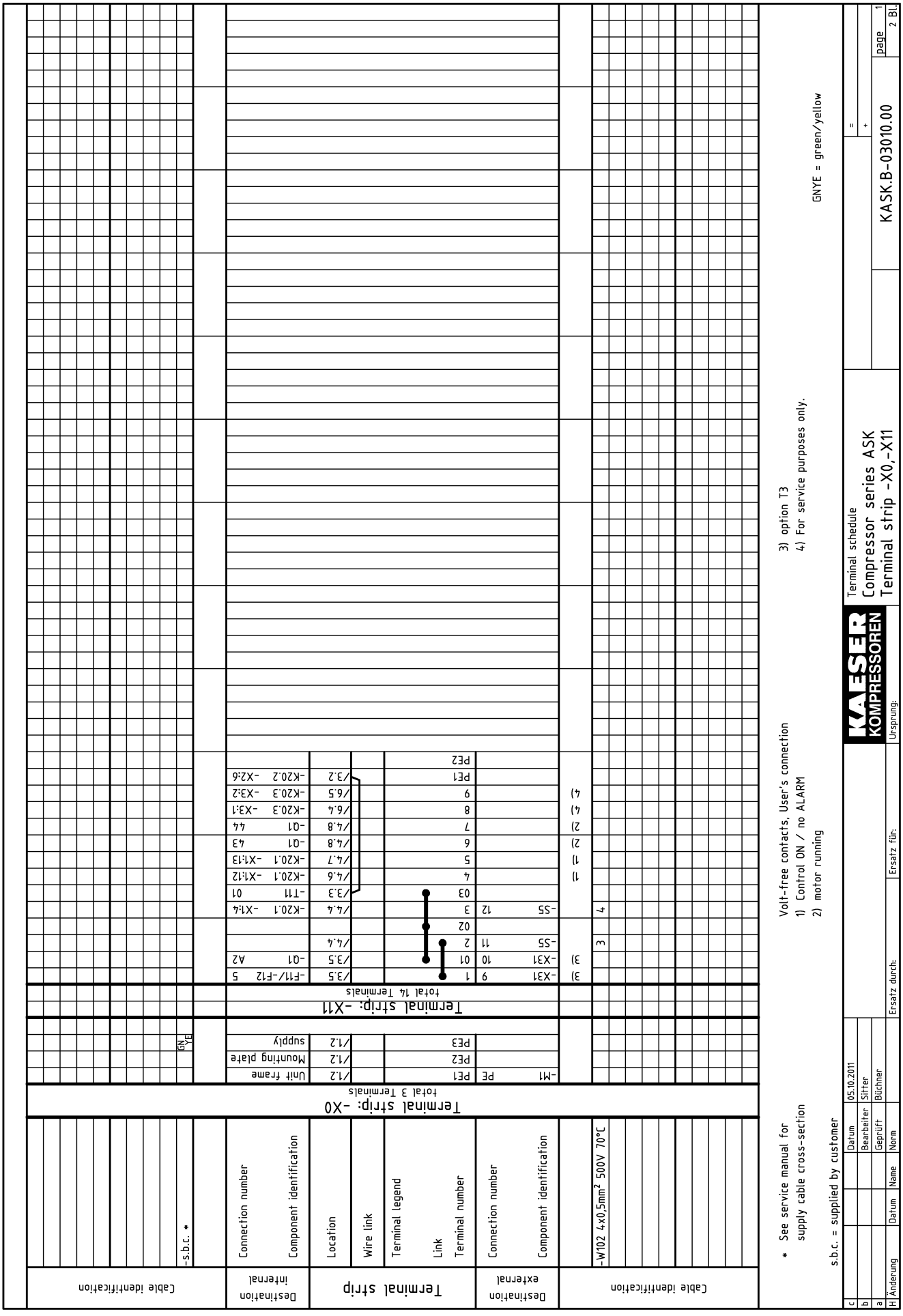
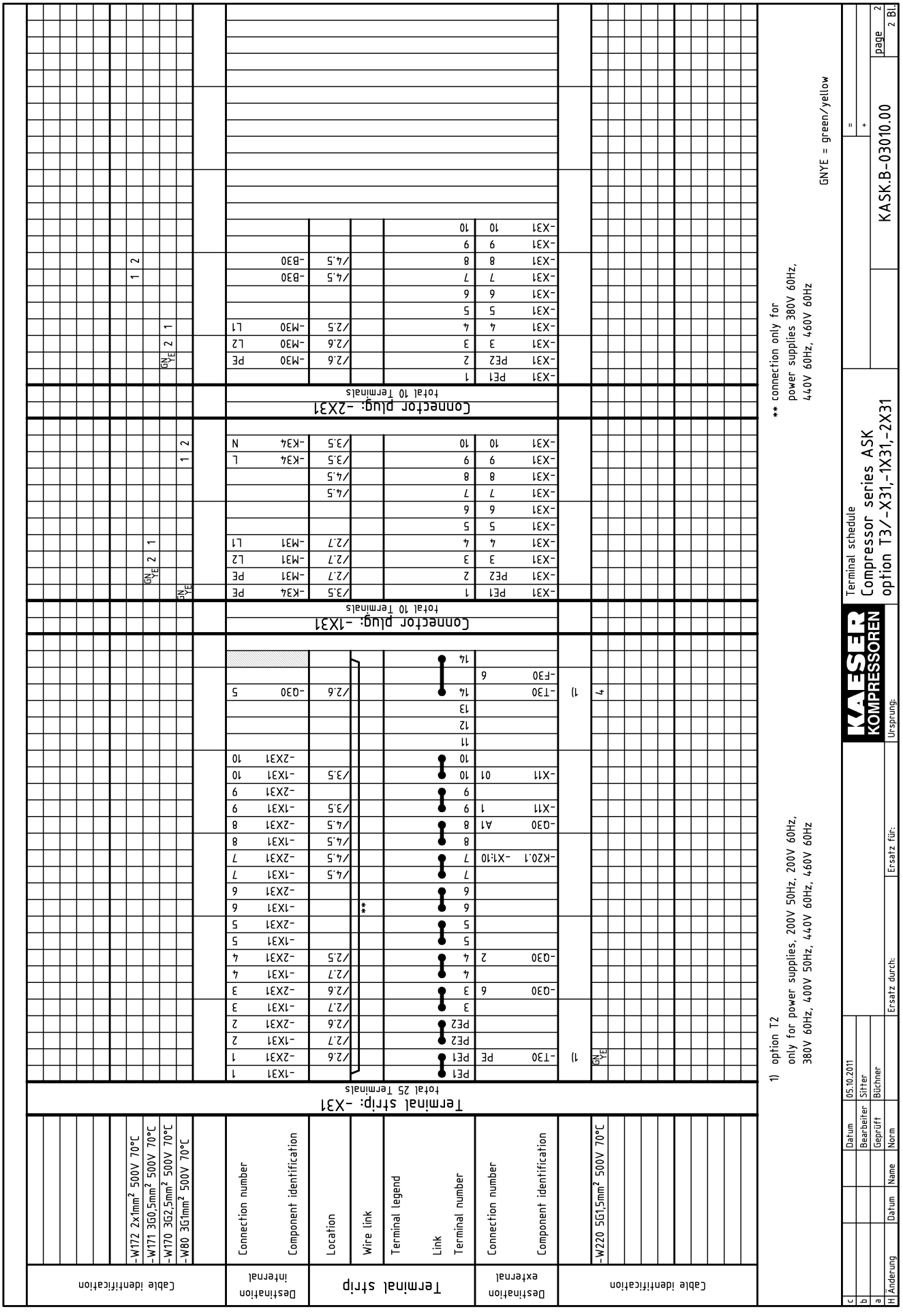
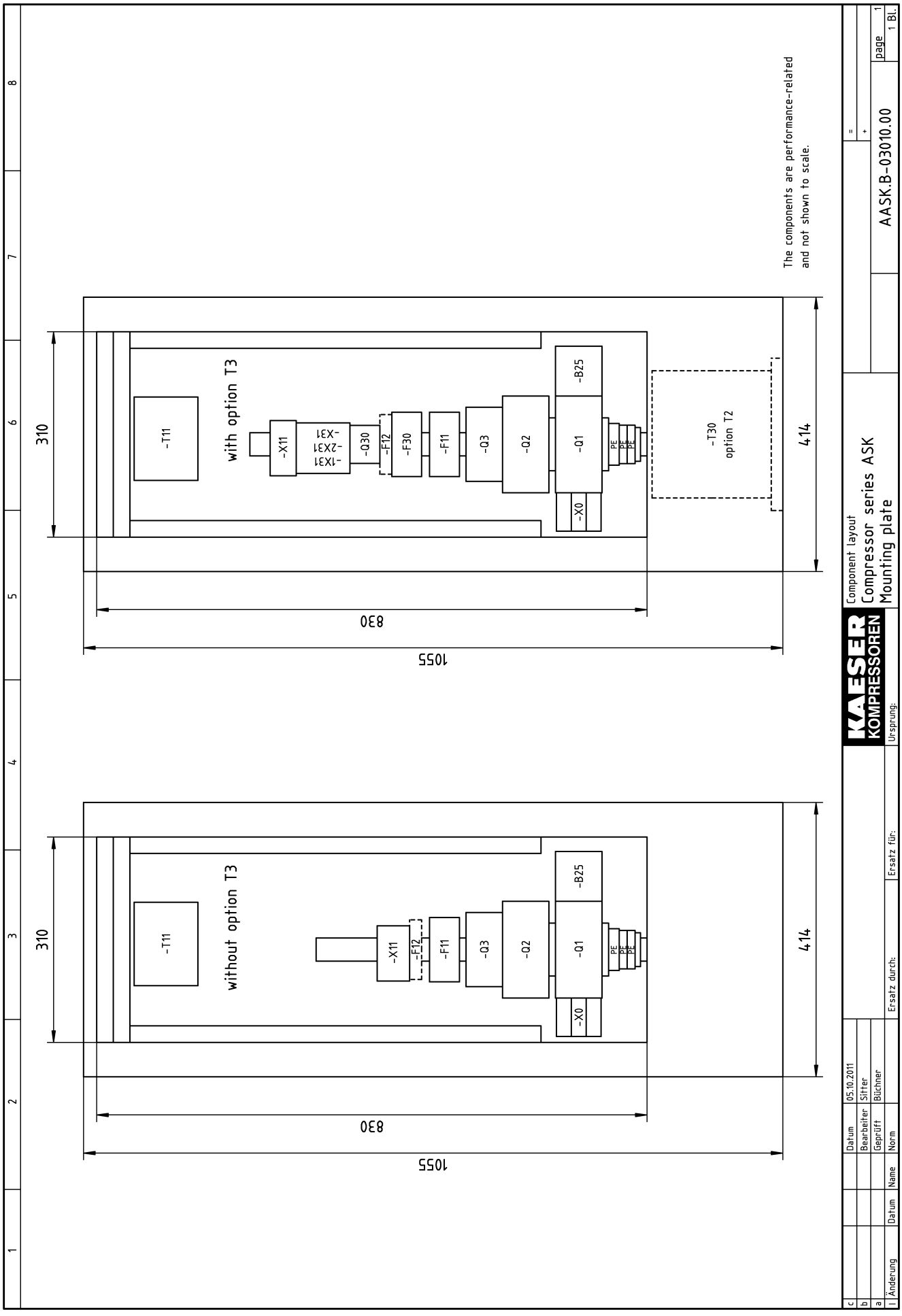


diagram 1
-T30
400V
L1
L2
-F30:1
-F30:3
0
-X31
14
PE1
-F30:5
230V
diagram 3
-T30
220V
200V
-F30:1
-F30:3
L1
L2
0
-X31
14
PE1
-F30:5
230V
diagram 2
-T30
primary
-F30:1
L1
L2
-F30:3
1
2
31
32
33
34
35
36
37
38
115V
0
-X31
14
*
PE1
-F30:5
230V
secondary
* ATTENTION !!!
Make an earthing connection between
terminal -X31:14 and -X31:PE1.
1x2,5mm² green/yellow 500V 70°C
primary
Power connection
L1
L2
420V
400V
380V 50Hz
0
0
0
400V
400V
400V
Power connection 1-2
primary
Jumper between:
460V
440V
380V 60Hz
32-36
32-37
31-38
KAESER KOMPRESSOREN
Circuit diagram
Compressor series ASK
transformer diagrams
SASK.B-03010.00
page 8
8 Bl.
Datum
05.10.2011
Bearbeiter
Sifter
Geprüft
Büchner
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:


Terminal strip: -X0
total 3 Terminals
Terminal strip: -X11
total 14 Terminals
Cable identification
Destination external
Terminal strip
Destination internal
Cable identification
-s.b.c. *
-W102 4x0,5mm² 500V 70°C
Component identification
Connection number
Terminal number
Link
Terminal legend
Wire link
Location
Component identification
Connection number
Unit frame
Mounting plate
supply
-M1 PE PE1
PE2
PE3
-X31 9 1
-X31 10 01
-S5 11 2
02
-S5 12 3
03
-T11 01
-K20.1 -X1:4
-K20.1 -X1:2
-K20.1 -X1:3
-Q1 43
-Q1 44
-K20.3 -X3:1
-K20.3 -X3:2
-K20.2 -X2:6
-F11/-F12 5
-Q1 A2
/1.2
/3.5
/4.4
/3.3
/4.6
/4.7
/4.8
/6.4
/6.5
/3.2
3) option T3
4) For service purposes only.
Volt-free contacts, User's connection
1) Control ON / no ALARM
2) motor running
GNYE = green/yellow
* See service manual for supply cable cross-section
s.b.c. = supplied by customer
KAESER KOMPRESSOREN
Terminal schedule
Compressor series ASK
Terminal strip -X0,-X11
KASK.B-03010.00
page 1
2 Bl.
Datum 05.10.2011
Bearbeiter Sitter
Geprüft Büchner
Name Norm
Änderung


Terminal schedule
Compressor series ASK
option T3/-X31,-1X31,-2X31
KASK.B-03010.00
page 2
2 Bl.
Terminal strip: -X31
total 25 Terminals
Connector plug: -1X31
total 10 Terminals
Connector plug: -2X31
total 10 Terminals
Cable identification
Destination external
Terminal strip
Destination internal
Cable identification
Connection number
Component identification
Location
Wire link
Terminal legend
Link
Terminal number
-W172 2x1mm² 500V 70°C
-W171 3G0,5mm² 500V 70°C
-W170 3G2,5mm² 500V 70°C
-W80 3G1mm² 500V 70°C
-W220 5G1,5mm² 500V 70°C
1) option T2
only for power supplies, 200V 50Hz, 200V 60Hz,
380V 60Hz, 400V 50Hz, 440V 60Hz, 460V 60Hz
** connection only for
power supplies 380V 60Hz,
440V 60Hz, 460V 60Hz
GNYE = green/yellow
Datum 05.10.2011
Bearbeiter Sifter
Geprüft Büchner
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Name
Datum


The components are performance-related and not shown to scale.
with option T3
-T11
-X11
-1X31
-2X31
-X31
-Q30
-F12
-F30
-F11
-Q3
-Q2
-B25
-Q1
PE
PE
PE
-X0
-T30
option T2
310
414
830
1055
without option T3
-T11
-X11
-F12
-F11
-Q3
-Q2
-B25
-Q1
PE
PE
PE
-X0
310
414
830
1055
KAESER KOMPRESSOREN
Component layout
Compressor series ASK
Mounting plate
AASK.B-03010.00
page 1
1 Bl.
Datum
05.10.2011
Bearbeiter
Sitter
Geprüft
Büchner
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung: